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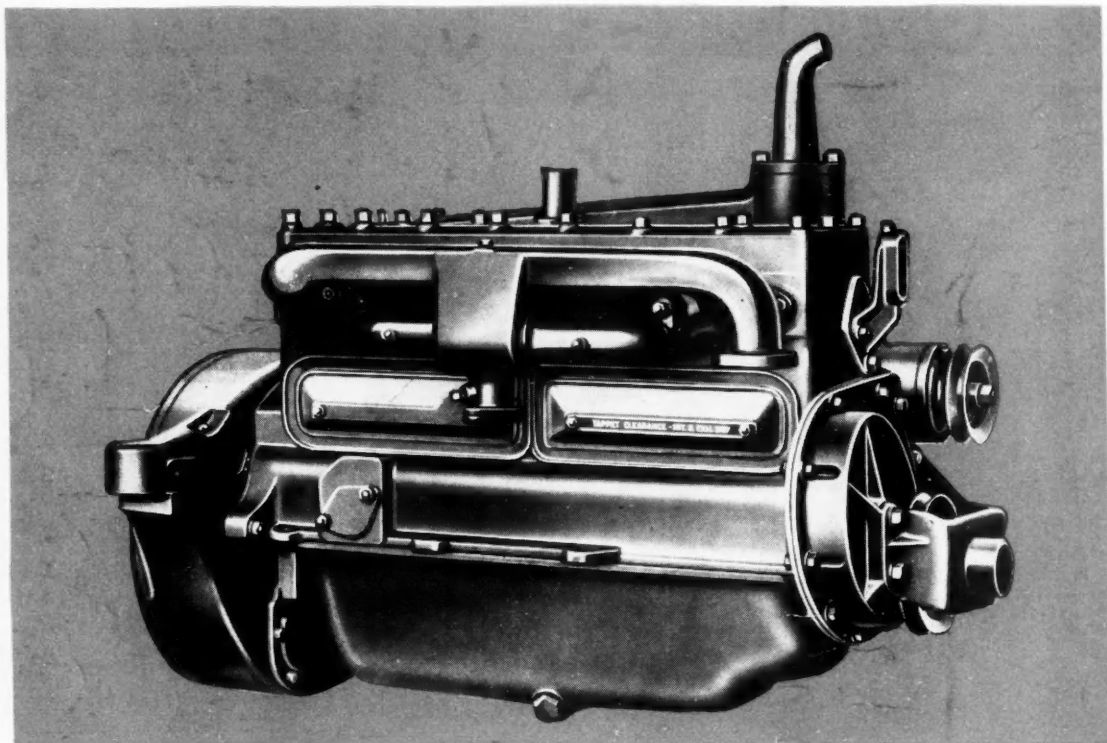


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AUTOMOTIVE INDUSTRIES

THE AUTOMOBILE

Vol. 64

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No. 20

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Automotive Industries

WYMAN- GORDON AVIATION FORGINGS

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REDUCTION
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ADDRESS the
AVIATION
DIVISION
AT WORCESTER

IN THE AIR
TO-DAY
AS ON THE
HIGHWAYS
FOR
30 YEARS

WYMAN- GORDON WORCESTER MASS. HARVEY HILL

May 16, 1931

3 GRAPHS

Showing How Increased Compression

... INCREASES POWER

... LOWERS HEAT TO COOLING WATER

... AND LOWERS EXHAUST TEMPERATURES

BECAUSE pressure raises the temperature inside cylinders before ignition, it is a commonly accepted idea that high compression engines present a heat problem.

Such is not the case. The waste heat of a high compression engine is less than that of a similar engine of lower compression ratio.

Obviously this is so, since when an equal amount of fuel is burned in each type, the higher compression motor converts a greater percentage of the fuel energy to power, leaving less heat to be dissipated through cooling systems and exhaust.*

These conclusions of theory are borne out by experimental practice. During several years the experiments made in Ethyl Engineering Laboratories have indicated this result, and data are now available from a series of tests which illustrate the point conclusively.

The accompanying graphs are

*This assumes the use of fuel of sufficient anti-knock value to prevent detonation in each engine.

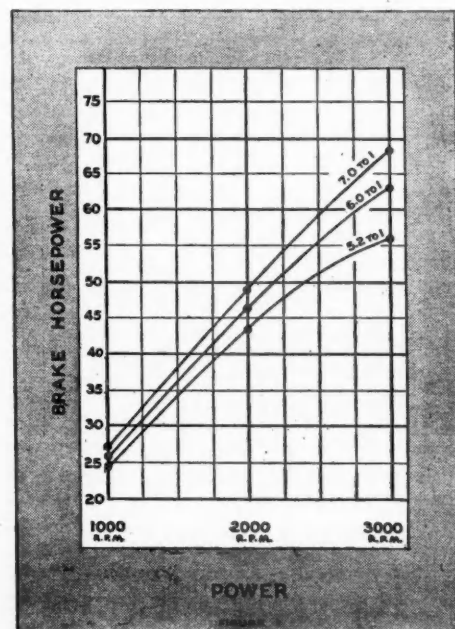
made from tests of a typical eight cylinder engine.

In Figure 1 the power of the engine is plotted with the use of three different heads to give compression ratios of 5.2 to 1, 6.0 to 1, and 7.0 to 1 (having compression pressures of 104 pounds, 130 pounds, 171 pounds, respectively). The differences in the percentage of power increases at different speeds are due largely to the use of planed heads to secure higher compression and do not exist if combustion chambers are correctly proportioned.

Figures 2 and 3 present the lower heat losses resulting from a more efficient use of energy. The cooler temperatures which the higher compression ratios maintain at given r.p.m. (because of their higher power output) become increasingly important as speed increases. The lower exhaust gas temperatures which accompany high compression ratios are of importance both because

of the lower temperatures imposed on the exhaust valves and because of the smaller amount of heat transmitted from the exhaust pipe to the driving compartment during hot weather.

Body-designing engineers will also find the curves in Figure 3 par-



Bigger Discounts Would Bring Wilder Trading, Dealers Say

WHY retailers think as they do is just as important as WHAT they think. Here's an attempt to look behind the scenes + + +

by Norman G. Shidle

A VAST majority of dealers answered "Yes" when *Automobile Trade Journal* asked them recently, "Do you feel that longer discounts would make selling cars a more profitable investment?" The exact figures were: "Yes"—257; "No"—81.

Comments which came in with the poll, however, showed clearly that a large proportion of dealers probably would view additional discount purely as a used car trading proposition, whether they voted "Yes" or "No" on the question asked. That, to us, was the most significant thing developed.

Practically all of those who answered "No," when they made any comment at all, gave as their reason the fact that longer discounts would simply mean wilder trading on used cars. That was to be expected.

But we were interested to note that many of those who favor longer discounts, stated as their reason, the belief that it would enable them to trade more advantageously.

Most dealers, in other words, whether they want bigger discounts or not, agree that the discount would be traded away. Their disagreement seems to come merely as regards the advantage or disadvantage of making possible this increased trading.

This being the case, the size of dis-



THIS isn't an argument about whether car dealer discounts should be higher or lower.

count to the average dealer becomes a relative, rather than an absolute, matter. In other words, if it is agreed that discount increases are to be used for used car trading purposes, the individual dealer should be just as much interested in how small his competitor's discount happens to be as in how big his own is. Some dealers recognize this clearly as is shown by the frequent interjection of such phrases as, "Yes, longer discounts would help—IF all dealers' discounts were nearly the same." Most of them, though, do not visualize clearly the importance of the relative element.

The next most impressive point developed by our investigation of current dealer opinion about longer discounts was the prevalence of the hope that this or some other general change in the set-up of the business would bring back dealer profits. Nearly every dealer has his pet panacea

—some of them have several, but a surprising number can be found who believe that nearly everything would be lovely if just the one thing which seems to them most important could be accomplished.

And the range of nostrums and real remedies incidentally found clinging to the side of this latest investigation runs the whole gamut familiar to all those who have been arguing about what's wrong with the automobile business for the last 10 years.

"While longer discounts would help relieve the present situation," one retailer writes, for example, "I believe that fewer dealers would be a much better solution."

Another, who thinks longer discounts wouldn't help because "the squirrels would only give more for the old 'uns," adds firmly: "Tightly closed territories only solution on all lines."

"Reasonable mark-up for freight handling" is the big need if automobile retailing is to be made more profitable according to another, unless longer discounts can be obtained. Still another urges higher list prices with all equipment included unless bigger discounts are allowed. It occurs to this latter dealer that "the car manufacturer has discovered he can make more real money out of a few extras than he makes out of the automobile."

"A longer discount would put ginger into the dealer and that is the cure," opines one retailer, thus agreeing with most factory sales managers of our acquaintance, at least as regards the potency of ginger as a business builder.

It's an attempt to let factory men inside the minds of dealers so that they may know the way dealers really are thinking on this subject. The factory executive, if he is to operate effectively, must know how the dealer thinks whether that thinking is straight or not. Too often loose thinking is merely sneered at; it should be the subject of study to determine its causes.

The limited questionnaire which forms the immediate basis of the present article was circulated to a list carefully selected to give wide coverage both geographically and as to makes of cars handled. It was supplemented by many personal discussions with dealers on the same subject both by the writer and other members of the Chilton Class Journal editorial staff.

"Restrict factory branches from competing with dealers on long trades" urges one handler of middle and high-priced cars who favors a longer discount as well.

"Cooperation among dealers will do more than long discount to make the retail business profitable," says a small town Middle Westerner.

Continued popularity for the car junking fund idea is another incidental fact developed through these latest queries. Several dealers who feel definitely that longer discounts would make selling cars a more profitable business, urge that the additional margin be given in the form of increased junking allowances.

This idea fits in with the psychology of forced saving which appeals to a great majority of people as individuals, whether in or out of the automobile business. A minority of people are self-reliant and self-confident. Plenty of life insurance is bought and

sold on the idea that the buyer ties himself up in such a way as to provide some demand outside himself to force him to save money.

Theoretically, the whole junking fund idea amounts to nothing more than an increased discount in itself. "Why not just let the dealer have the extra discount directly and let it go at that?" argue those companies which do not have a junking plan.

"Because," reply those who do—and many dealers like many insurance buyers confirm their psychology—"they would trade it away much more quickly and easily if they got it directly as discount instead of indirectly as a junking fund."

Whether this line of thought is correct or not, most dealers favor junking plans and some go even further in urging that profits be kept out of their own hands until too late for them to be traded away. This is illustrated by the following very interesting comment from a dealer for a low-priced car out in Kansas. He says:

"Longer discounts would not make selling cars a more profitable business unless a plan could be used to withhold the added discount from the dealer.

"I would propose an additional two per cent on low-priced lines to be returned to the dealer in December of each year. Also, dealer could not receive this until he had been a dealer more than three years. Just an additional discount distributed promiscuously would be dissipated with no good excepting a higher trade-in for the customer."

(Turn to page 771, please)

JUST AMONG OURSELVES

More Cash Purchases in Bad Times

INTERESTINGLY enough, there is a greater tendency toward paying cash for automobiles in bad times than there is in good. We haven't been able to find any general figures on the subject which seem to us to be truly indicative of what has happened on this score recently. But several individual car companies do report that a greater *proportion* of their sales are being made for cash now than was the case back in 1929.

Reason apparently is twofold. Those making retail loans are being much more conservative about whom they lend to—just as a matter of self-protection. The average purchaser, on the other hand, feeling less secure about his job and income than he has in many years, is loath to mortgage his future as he cheerfully does when that future looks rosy. Much of the decline in car sales, consequently, probably can be attributed to the fact that a good many people who, in good times would buy on time, today feel that either they must wait until they actually have saved up the cash in advance or refrain from buying altogether.

Employment Uncertainties Cut Sales Volume

THERE is much of truth, we believe, in a statement we heard the other day: "The fear that lies in the heart of the average man today of losing the job

which he has is the major deterrent to a real pick-up in automotive sales of all kinds; its adverse effect on sales is far greater than that of actual unemployment. Were it possible in some way to assure every man working today that he would have his job permanently, automotive sales would increase materially within thirty days."

Railroads Pay No Taxes

FOR the best job of putting the railroads on the defensive and bringing out forcefully the positive case for motor transportation, we nominate Horace M. Hill, president, Janney, Semple, Hill & Co. of Minneapolis, Minn. In a talk called "What Price Transportation" from radio station WCCO on March 18, 1931, he lambasted railroad actions, policies and propaganda with a high vigor which was fully equalled by the soundness of his factual data and the intelligence of its presentation.

In reply to the railroads' contention that they are too heavily taxed, for example, he jumps in to prove that they don't actually pay any taxes at all. Because the I.C.C. is empowered to "initiate, modify, establish or adjust rates so that carriers will earn an aggregate net income equal to a fair return upon the aggregate value of the railway property used in the service of transportation," he points out that "it is clear that the railroad corporations do not *pay* the taxes assess-

ed against railroad property and income. They merely collect it from the shipper as a part of the established freight rate."

Since this talk came to us in printed booklet form, we assume that you also could get a copy of it by writing to Mr. Hill. It's worth reading—and filing for reference.

To Make the Shoe Fit—

ANY sensible person, of course, must sympathize with the present predicament in which most railroads find themselves, even though one may argue that a good share of that predicament has been brought about by past actions of railroads themselves.

As regards rates, they find themselves needing higher rates if they are going to make money, and lower rates if they are going to get sufficient business. Thus it is not at all illogical to find the rail carriers seeking lower rates on some commodities in some areas and higher rates on other commodities in other areas. Only by detailed attempts to fit particular rate structures to competitive conditions can the railroads hope to find and hold that peculiar place in the transportation picture which always must be theirs.

It's difficult for an automotive man not to feel that they will benefit both themselves and the public more by striving to get limiting restrictions removed from their own operations than in putting major effort into trying to get the bus and truck so hampered as to decrease the economy of its potential service to the country.—N.G.S.

Milwaukee Stages Successful National With Varied Papers and Two Plant



H. L. Horning, past president of the S.A.E., was toastmaster at the Production Dinner

by
**Joseph
Geschelin**

S A. E. Production activities were carried westward last week through the determined efforts of the Milwaukee section's committee headed by J. R. Franz (LeRoi) and P. C. Ritchie (Waukesha). And they certainly put it

over. When those who didn't attend get the details of the Dutch lunch on Thursday evening they will certainly make a private resolution to be there the next time.

Briefly, the two days' activities included a visit to the A. O. Smith frame plant—surely one of the wonders of the present age; two technical papers the first day; and two technical papers the second day. The wind-up came with a corking good dinner on Friday night. The sessions on Friday were quite an innovation, each paper being followed by a plant visit and demonstration. Kearney & Trecker attracted a crowd of more than 300 production men with an exhibition of high-speed milling on a battery of ten Milwaukee milling machines designed for cemented tungsten carbide utilization. Cutters were of the new K & T design in various styles featuring all available cemented tungsten carbides, including Carboloy, Widia, and Firthite. Ramet, the new tantalum carbide, gave startling performance in milling drop-forged steel gear blanks.

Those attending the Production dinner found an unusual treat in store when Dr. E. A. Ross, noted sociologist, University of Wisconsin, unfolded a new economic thesis which he chose to call "The Deepening of Capital." A study made at the university shows that from 1840 to 1920 a constant increase has occurred in the amount of capital invested per worker in various industries. In 1920 it was about 10 times the amount invested in 1840 and represented about \$5,000 per worker on the average. This

rise in invested capital accounts, according to Dr. Ross, for the subsequent inertia against shorter hours in industry. In periods of suspended production the relation shows clearly the tremendous losses borne by the capital structure.

Following this theme, the speaker projected into the future and suggested the possibility of division of capital investment in a modified form of public ownership. This might apply to industries where capital investment per worker exceeds \$15,000. The object would be to reduce capital charges and release a larger proportion of earnings to the worker. In times of severe depression the bolstering effect of public funds may keep a greater proportion of industry active and thus relieve the situation to a greater extent than is now possible.

Materials Handling With Industrial Trucks



Charles B. Crockett

Industrial trucks as mobile equipment for periodic processes were discussed in fine style by C. B. Crockett, in his paper, "The Place of Electric Industrial Trucks in the Handling System of Automotive Plants." Conveyor systems, of course, are admittedly the most economical of production lines, for uniform flow of uniform materials. The place of the industrial trucks is in the many points where occur the periodic processes such as loading and unloading of freight cars, handling of sheet steel, storing

Table 1

Effect of Shipment by Skids from Producer to Consumer

	Tray Method	Skid Rack Method
No. of brakes per car	2,400	3,840
Total packing and loading cost per car	\$126.50	\$32.16
Cost per brake	.053	.008
Percentage saving		85%
Damage in transit	2%	0%

Production Meeting of the S. A. E. Demonstrations

bulky parts, and handling of non-uniform materials. A number of specific illustrations were given to show the variety of applications, which included the handling of press dies, bundles of sheet steel, and stacks of skids containing finished parts.

Cost comparisons are very interesting. Table 1 shows the relative costs of skid shipment of brakes by the Bendix Brake Company, as compared with the original method of handling. Under the former method brakes were placed in trays from storage, wheeled to car and loaded, the maximum possible height being 12 tiers and permitting the shipment of 2400 brakes per car. The total cost for labor, lumber and bracing under this method was \$126.50 per car, or \$0.53 per brake. The new method is to place brakes in built-up skids at the completion of inspection. These are moved directly to cars by means of electric lift truck, each skid containing 240 drums.

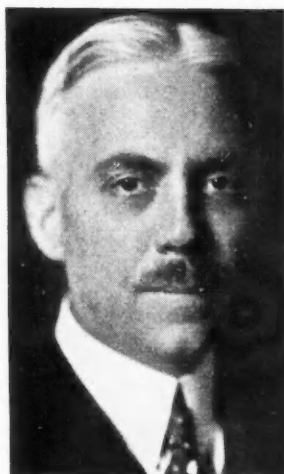
Another interesting cost comparison—Table 2—is given on the handling of heavy body dies. The new method shows the effect of utilizing high capacity (30,000 lb.) die handling trucks.

Nickel Alloys in Automobile Manufacture

Probably very few of us realize the extent to which nickel is used in the automotive industry. Its utility in foundry practice; use in alloy steels, also for heat-resisting alloys; and in production tools such as die

blocks, will be better understood after reading, "Nickel Alloys in Automotive Manufacture," which was presented by T. H. Wickenden of The International Nickel Co., Inc.

In foundry practice nickel is found to be a valuable tool not only to produce the desired physical properties, but also to assist the foundryman in overcoming foundry or shop difficulties. The key to successful applications is the determination of properly balanced mixtures defined by the author as "one in



T. H. Wickenden

Automotive Industries

Table 2

Cost Comparison of Die Handling Methods Direct Labor Cost

	Min.	Max.
Old Method		
No. of men required	9	12
Hours for one change	1 1/2	2
No. of changes per day	10	20
Labor cost at 55c/hr.	\$74.00	\$264.00
New Method		
No. of men required	5	2
Hours for one change	.5	.33
No. changes per day	10	20
Labor cost at 55c/hr. & truck cost at 75c/hr.	\$9.52	\$12.37
Saving per day	65.00	251.63

Idle Machine Hours

	Min.	Max.
Old Method		
Hours for one change	1 1/2	2
No. of changes	10	20
Total hrs. lost press time	15	40
New Method		
Hours for one change	.5	.33
No. of changes per day	10	20
Total hrs. lost press time	5	6.7
Saving in press hours	10	33.3

which the thickness of section, the total carbon, silicon, nickel and chromium content are considered, and the mixture is properly balanced when it will produce the desired hardness combined with a proper microstructure (see Fig. 1). For wearing parts the structure should be one showing finely divided graphite practically free from either free cementite or free ferrite, the body of which is finely divided pearlite or even sorbite. The presence of an excess amount of free carbide will result in difficult machining and rapid dulling of the tool. It also results in irregular wear and is sometimes the cause of scoring of the cylinder walls. The presence of free ferrite, of course, would indicate that the iron was too soft, with a tendency to wear easily and probably would not meet the hardness specifications."

The following are some of the reasons for using nickel in foundry practice:

1. To refine the grain by producing finer graphite flakes and secure a high lustre on a finished surface.
2. For reduction of porosity and internal shrinkage to produce pressure-tight castings.
3. To eliminate chilled corners and edges and other hard spots in gray iron, thereby improving the machinability.
4. To increase the hardness of gray iron, especially in heavy sections, and retain machinability at hardnesses over 300 B.H.N.

May 16, 1931

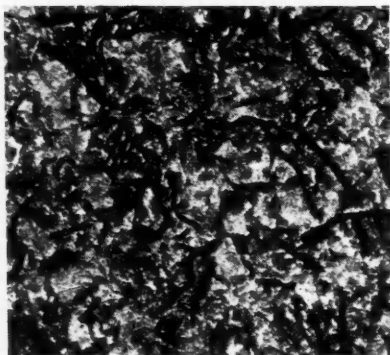


Fig. 1-A

Unbalanced brake drum irons. This iron contains same alloy but it is not properly balanced with the rest of the mixture. B.H.N. 180. The free carbide particles wear in relief resulting in tearing out the brake drum. Both illustrations are magnified 75 times + +

*Produced by
Motor Casting Com-
pany, Milwaukee.

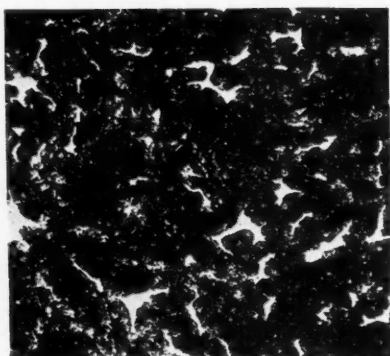


Fig. 1-B

Microstructure of balanced brake drum irons. High Strength Nickel Iron* 1.25 to 1.50% Nickel. B.H.N. 223. Structure sorbite and very fine pearlite with very few carbide spots which assure smooth wearing surface. Tensile strength over 50,000 p.s.i.

5. To equalize the hardness in thick and thin sections, resulting in a reduction of casting strains and less subsequent warpage.
6. To secure resistance to wear and abrasion.
7. To secure stability of composition, strength and hardness when maintained at elevated operating temperatures.
8. To increase the strength.

Mr. Wickenden's suggestions concerning the machining and heat treating of nickel alloy steel will be found very helpful. He says in part that,

"In the past it has been common practice in preparing nickel alloy steels for machining to anneal them so that a fairly fine grained structure would be secured, but recent work by several of the automobile and gear producers has shown that a coarser grained material would show better machining properties. On the low carbon nickel steels used for carburizing, such as SAE 2315, 4615, and 2512, it was former practice to heat these steels to 1550 to 1600 deg. and cool in the air, securing a hardness of between 180 and 200 Brinell. If the steels were annealed so as to secure softer hardness, then the difficulty was encountered on the steel tending to tear during machining. It has been found that by developing a fairly coarse grained structure the steels can be annealed to a very low hardness and smooth cutting properties secured. The treatment used at one automobile plant consists of heating them to 1750 deg., holding at this temperature for about four hours to permit the grain structure to build up, and cooling in the furnace until black. This results in a hardness on the piece of between 137 and 149 Brinell. At this low hardness, instead of the steel tending to pick up on the tool and tear, there seems to be no tendency to do this and a very smooth finish is secured. It is possible to increase the rate of machining and the

life of the tools is increased in many cases four times. The structure secured is fairly coarse grained, with the pearlite and ferrite islands being well defined and the pearlite islands showing a lamellar structure under high power. With this treatment it is common to use roughing cuts on ring gears of between 100 and 120 ft. per minute. Finishing cuts apparently give the best finish at around 85 ft. per min.

"The selection of a proper cutting fluid has also been shown to be beneficial in the machining of this type of steel. An oil containing about 8 to 10 per cent lard oil, 0.8 to 1 per cent flour of sulphur, 10 to 20 per cent kerosene, the balance mineral oil to give about 200 viscosity has been reported to give a fine finish on soft steels. The presence of kerosene is reported to prevent any 'pickup of fine particles on the tool point.'"

New Development in Surface Hardening of Steel

Precision control of the case structure of carburized parts coupled with the reduction of production costs were promised by H. E. Koch, Hevi-Duty Electric Company, in introducing the new Hevi-Duty vertical electric gas carburizing furnaces. Among other things his paper, "New Developments in Surface Hardening of Steel and Their Effect on Cost of Production," cites some remarkable economies due to shorter carburizing cycles. One example shows a cost per pound of \$00.-0083, as compared with \$00.0236 for box carburizing when all costs including depreciation on investment are considered.

Mr. Koch stressed the principle of "diffused case structure" (Fig. 2), obtained by holding the heat without supplying carburizing gases. This permits carbon to run in so that the outer structure loses some of its carbon content, thus eliminating free cementite. Moreover, this diffused structure produces a thick case having a uniform hardness through to some reasonable depth.

The furnace shown was of typical construction and with a suitable change, piping may be used for nitriding or gas carburizing selectively. Its construction is described briefly as follows:

"The heating chamber is the standard form of construction used by our company. The elements are arranged so as to give one, two, or three independently controlled zones depending on the depth of furnace used. Inside the furnace chamber is the carburizing container or retort which at its top section is closed gas tight by means of an insulated plug type of cover which has mounted on it a motor-driven fan mechanism. Suitable inlet, outlet and test thermocouple entry pipes are provided and sealed gas tight in the cover. The fan is of the centrifugal type, discharging laterally and having a center suction. In addition it has a curved deflector plate



H. E. Koch

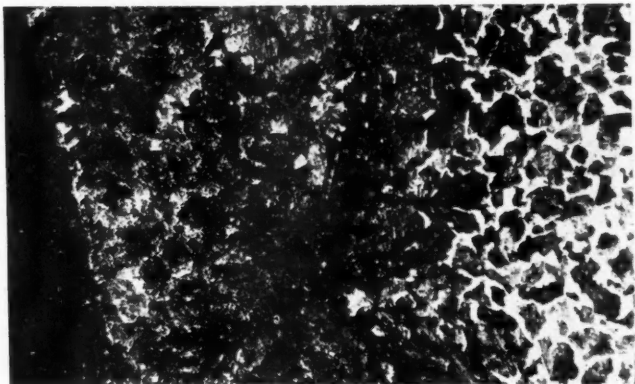


Fig. 2—Microstructure of gas carburized work showing diffused case structure + + + + +

which guides the discharge gases downward along the hot sidewalls of the retort."

It is interesting to note that contrary to the general impression, a free flow of gas over the work is not desirable. Wherever free flow tends to take place it is purposely disturbed to produce turbulence, which is the principal function of the fan. The object of the turbulence effect is to get molecular collision, to break up the heated gas because careful tests have shown that heat alone is insufficient to break up the gas effectively.

An interesting feature brought out by the speaker is the fact that his company has placed on the market a chemical mixture called "Carbonal," which they recommend in preference to the use of available city supply. This product is designed to produce uniform results and operating economy. Another advantage is that "Carbonal" does not penetrate a well copper-plate surface whereas some natural gases do.

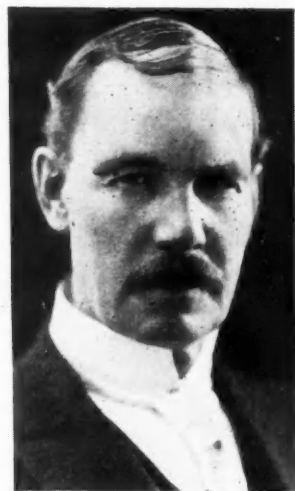
Faster Milling With Tungsten and Tantalum Carbide Cutters

Undoubtedly one of the most important contributions in the field of machine shop practice is, "Latest Developments of Faster Milling with Tungsten and Tantalum Carbide Cutters," which was presented by Frank W. Curtis of Kearney & Trecker. This paper stresses three major factors without which the utilization of the new cutters would be impossible. These

factors are: (1) machines with adequate power, speed and rigidity; (2) cutters of proper design, size and form; and (3) rugged, quick-acting fixtures to speed loading and unloading operations. Perhaps the most promising economy resulting from the use of the new K & T cutters is the saving in prime material cost due to the possibility of machining with only one cut right through hard scale. This also permits a speeding-up of feeds with consequent reduction of cost. Ac-

cordingly, then, the depth of cut may be reduced, machining allowance reduced, roughing operations may be eliminated, and feeds increased without overloading the machine.

Mr. Curtis points out that, "Milling fixture design appears to stand out quite prominently among the important changes to accompany the use of tungsten carbide. Improved methods of clamping are obviously needed. The traditional methods of applying straps, bolts, nuts and screws to fixtures are doomed. Quick-operating, fool-proof clamping devices are highly essential with tungsten carbide operations. This means that in many cases the loading time of an operation will have to be lessened in proportion to the reduction in machining time in order that the full benefits of tungsten carbide may be attained.



Dr. E. A. Ross, who spoke at the Production Dinner

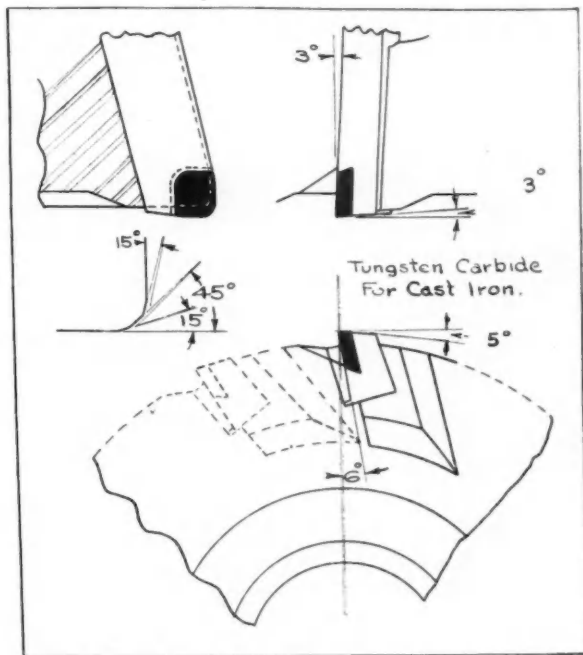


Fig. 3—K & T cemented-tungsten carbide milling cutter for soft or medium cast iron. Note recommended tool form + + + + +

"In many cases, it will be possible to use existing fixtures, whereas, on the other hand, it will be necessary to provide new fixtures. This reason needs little explanation. Tungsten carbide milling requires unusual rigidity, and it is natural to assume that some older fixtures do not have the strength normally required for faster milling. Lack of rigidity is apt to

(Turn to page 771, please)



F. W. Curtis

World's Industrial Ills Are Diagnosed

by Leslie Peat

EMINENT diagnosticians of world industrial troubles met in Washington last week as delegates to the sixth biennial congress of the International Chamber of Commerce and generally agreed that most of our present troubles can be traced to the World War and its aftermath. President Hoover, in opening the congress, said that world armaments and effects of the war have contributed most to the present depression.

Other speakers, leaders in the industrial life of nearly 50 nations, discussed in detail post-war attempts at monetary stabilization, the drop in the price of silver, excessive taxes, international debts, tariffs which restrict free flow of goods and raw materials, over-production and its devastating corollary—under-consumption and the problems of modern distribution.

It was a vigorous session. Commerce and individuals have been facing crises of impelling importance during the past two years in particular, and since the feverish days of the war in general.

Much of the keenest analytical ability of world economic authorities has been spent upon these problems. The speakers were universally frank and outspoken regarding mistakes of industry and of governments alike, but the congress failed to initiate steps to open the important, although delicate, question of re-examining the Allied war debts and German reparations payments.

There was agreement in the belief that we are entering the dawn of a new economic era; that many economic concepts of the past few decades must be junked; that today's leadership will go a long way in so adjusting great economic forces as to prevent, or at least to minimize, depressions of the future.

1. Revolts in Honduras and Nicaragua, and disturbances in Cuba.

Banditry practically stopping imports and general commercial activity.

2. Revolution in Panama.

Confiscation of many warehouses forced cessation of imports.

3. Revolution in Peru.

Embargoes, confiscation of merchandise for war purposes and other military orders have halted commercial intercourse.

4. Political unrest in Uruguay.

5. Revolution in Argentina.

Major part of foreign trade halted by internal crisis.

6. Revolution in Brazil.

7. Economic depression in Great Britain.

8. Fascist and Communistic disturbances in Germany.

9. Political unrest in Austria.

10. Economic situation dominated by dictatorial government in Italy.

The lesson of the interdependence of nations has been forced upon the consciousness of the world, speakers agreed. No longer will nations be able to stage civil wars and radical upsetting of their established governments without effecting a turmoil on all the bourses of the world.

So complex is the industrial structure of the world today that no longer can the effects of unemployment, over-production or over-expansion be confined within the geographical or political boundaries of any large nation.

Sir Arthur Salter, who as director of the economic and financial section of the League of Nations has been able to get a clear view of the present panorama of world distress, told the delegates that he confidently sees the end of our present difficulties.

"Ours is a problem of the impoverishment that comes from plenty," he said.

"However difficult, this is capable of solution and offers the richest of prizes if we can solve it.

"If only we can refashion our system to use fully our productive capacity and employ again those who are idle, there will be a leap forward in prosperity such as the world has never seen."

George Theunis, one-time Premier of Belgium and retiring president of the International Chamber, hit

Where International Economic



by Business Leaders

the high level to which world tariffs have been built.

"In the long run, economic laws always assert themselves," he said. "Governmental interference as practised in Europe particularly, and to some degree in the rest of the world, has no place in our economic system today.

"I am convinced that the commercial policy and the customs tariffs in force throughout the world constitute one of the fundamental causes of our actual economic troubles."

The speculative boom preceding the present depression was branded an "American product" by many of the speakers, most of whom referred to it as one of the most important immediate causes of the present world trade recession.

In its earlier days, when this boom enticed money from the exchanges of Europe, and later in the sharp recession drop of security and commodity prices, it helped to precipitate, and then to aggravate, the economic situation in many countries, it was held.

But most of the panics were brought about by intervention of the government into the affairs of private business. Through autocratic political domination of industry and commerce by governments which had but a slight advantage in their majorities, or by dictatorships which had been created "aggressive minorities,"

Fevers Have Been Raging



Automotive Industries

Over three-quarters of the commercially important population of the world has been in a state of social and political upheaval at some time during the past three years.

—President Hoover, before the International Chamber of Commerce.

the depression became a subject for political debate and the object of numerous politico-economic experiments.

The President believes this depression was contributed to by many very important, immediate economic causes, but held that the destruction of life and property, the great tax burdens, and the social and political instability which resulted from the great war have had large responsibility in its origins.

"Over three-quarters of the commercially important population of the world has been in a state of social and political upheaval at some time during the past three years," he said.

Although some secondary part of this political instability may have been the result of immediate economic causes, we cannot ignore the malign inheritances from the great war.

"We stand today with nearly 5,500,000 men actively under arms and 20,000,000 more in reserves.

"This vast armament continues not only a burden upon the economic recuperation of the world, but of even more consequence, the constant threats and fears which arise from it are a serious contribution to all forms of instability, whether social, political or economic."

11. Military coup d'etat and general economic depression in Portugal.
12. Overthrow of Bourbon dynasty (Alfonso XIII), following iron-ruled regime of dictatorship in Spain.
13. Overthrow of parliamentary government by coup d'etat by Carol in Rumania.
14. Macedonian revolution has upset provisional government in Bulgaria.
15. Political and economic unrest in Egypt.
16. Revolt under Mustapha Kemal in Turkey.
17. Economic reorganization and unsatisfactory foreign-relations situation in Russia.
18. Nationalist rebellions and general economic unrest due to changing from silver to gold standard in India.
19. Civil wars continued most of year in China.
20. Economic reorganization and political disturbances in some sections have added to depressed conditions in Australia.

European Ford Activities Are Weathering Depression

British and Seven Subsidiary Companies Show 22½% Gain in Earnings Despite Unfavorable Conditions

Sir Percival Perry Hits British Industrial Vehicle Tax Systems as Unsound and Restrictive + + +

IN spite of the disturbed economic world conditions, the overseas Ford Motor Co., Ltd., properties made substantial progress during 1930, a review of the company's balance sheets and reports of the British and seven associated companies shows.

Unusually high tariff barriers erected in France, Spain, Belgium and Holland, and high taxes have been overcome by increased manufacturing economies, according to Sir Percival Perry, chairman of the company, whose recent annual report¹ set forth earnings of \$14,289,000, an increase of about 22½ per cent over the 1929 operating earnings of the eight Ford companies under his management.

These profits were earned by the employment of less than one-third of the company's total resources, since approximately two-thirds of the total resources are being used in building operations and other capital investments not now applied to manufacturing and merchandising motor vehicles.

The Dagenham plant project, on the Thames near London, represents upwards of \$10,000,000 of this "locked" capital. Delays caused by trouble in reaching foundation footings in the lowlands where the power house and other heavy structures are to be built, have postponed the opening date of this factory, according to Sir Percival.²

The Cork plant of Henry Ford & Son, Ltd., showed a loss of about \$300,000, however, for the 1930 fiscal year. This company manufactures the Fordson tractor, for sale throughout the world, including the United States.

Depressed world economic conditions have prevented a better showing of the tractor company, according to Sir Percival. "Everywhere, with distressing unanimity, orders have been cancelled for the only reason that farmers cannot afford to buy," he told his directors.

Taxation problems, both corporate and vehicle, have been deterrents to the industry in Great Britain, he said. Because of the method used by the British, English and Irish tax authorities to compute depreciation, the company was forced to pay an in-

¹*Automotive Industries*, April 4, 1931, page 567.

²*Automotive Industries*, March 8, 1931.



Sir Percival Perry

Chairman of Ford Motor Co., Ltd., who said recently: "It is an irony of the circumstance of the incidence of taxation that response to impassioned appeals by our Government ministers for the exercise of economy is the necessity for practical business men to correct injustices and anomalies of our State revenue system."

come tax on the net loss of the Cork plant. "Few responsible directors consider it proper to represent to shareholders that plant, machinery, tools, and other assets are worth what government authorities insist shall be taken as their value for purposes of taxation," he said.

"The British Government practice of disallowing adequate depreciation is responsible for a large portion of the present industrial and labor problems of our country. Many manufacturers feel compelled to continue using antiquated and obsolete machinery

Approximate Average Ford Prices In European Countries

Holland	\$780
Denmark	825
Belgium	925
Spain	925
Germany	925
France	1,020

and methods, and workers are blamed for being inefficient, whilst they are denied the means of improving themselves and keeping pace with foreign competition.

"I am sure this is true of the engineering industry, and I suspect that the intense gloom which envelops the cotton and coal industries would be considerably dispelled if more recognition of commercial necessities were displayed by our Government authorities. The loss of a little income tax would be more than compensated by saving in unemployment dole," he continued.

A high license tax for motor vehicles has been another serious element in the general curtailment of the automotive industry in Europe, he pointed out. In Great Britain, the theory of the tax is that the use of public highways should be paid for by motor cars in relation to the power of the engine used, and that the power of an engine is wholly and solely determined by the diameter or width of the cylinder. "Every authority except the tax collector knows that both of these premises are erroneous," he commented.

Clever engineers, in order to avoid the horsepower tax, have designed cars which are so high priced that only the extremely wealthy can afford to buy them, and yet these cars pay only \$70 or \$75 per annum tax, while the humble purchaser of an inexpensive car, designed in accordance with the accepted best practice, has to pay \$115 or \$120 per year.

"Our Ford car, if it were designed to run upon three wheels only, would pay a tax of £4 per annum instead of £24. By the omission of one wheel we should escape five-sixths of the taxation, and yet the taxation has nothing to do with wheels! Many millions of pounds sterling have been spent during the last two generations in endeavors to improve upon the four-stroke or Otto cycle, i.e., the fundamental principle by which all motor-car engines operate, and which is now more than 50 years old."

If one was successful in building an acceptable two-stroke engine, the revenue derived from motor-car taxation would be automatically and instantaneously reduced by 50 per cent, in accordance with the horsepower formula upon which revenue is now calculated and raised in Great Britain.

So excessive have been taxes that the Ford European management has adopted the "Luxemburg cure" for this difficulty by incorporating a holding company in that tiny European grand duchy, because of reasons similar to those which encourage tax-troubled companies to incorporate in the State of Delaware, in this country.³

Thus the Ford Investments Corp. made it possible for the Ford management to circumvent a 22½ per cent tax, which would have been collected by British authorities had not this holding company been formed. All European holdings of Ford companies have been turned over to this investment corporation.

The following table shows the degree of corporation taxation in Europe, as reported by the Ford management:

	Per Cent		Per Cent		Per Cent
France	21	Spain	19	Sweden	20
Germany	41	Italy	20	Denmark	15
Belgium	19	Holland	16	Finland	29

The reorganization of the Ford interests in Italy has not been completed.⁴ The business has been conducted at a profit, but the situation generally is unsatisfactory. The company purchased land at Livorno with the intention of erecting one of the usual Ford assembly plants. The Italian Government notified the management verbally not to proceed, but the company as yet has failed to obtain refund of the money paid for this land, or, in fact, written communication of any kind.

"At the suggestion of the government we negotiated and actually concluded a manufacturing agreement with one of the largest automobile manufacturers already established in Italy, only to dis-

³Automotive Industries, April 4, 1931, page 565.

⁴Automotive Industries, August 23, 1930.

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Net Earnings and Dividends on Ford Overseas Operations

	1929		1930		1930 Percent- age of Increase in Earnings
	Earnings	Dividends Percentage	Earnings	Dividends Percentage	
England	\$4,463,000	10	\$5,848,000	10	31
France	2,273,000	10	2,419,000	12½	6½
Denmark	1,566,000	10	1,949,000	10	24
Belgium	1,368,000	13	1,197,000	15	-12½
Holland	746,000	10	930,000	20	24½
Germany	591,000	10	764,000	10	29
Spain	521,000	10	647,000	15	24
Sweden	117,000	10	535,000*	10	358
	\$11,645,000		\$14,289,000		22.7

* Plus 25 per cent stock bonus.



Advantage of Streamlining

Final article of series on rear engines shows value of reducing wind resistance

by
P. M. Heldt

IN rough calculations it is often assumed that the air resistance encountered by moving bodies is directly proportional to their projected area in the direction of motion, and independent of their form, but this assumption is far from being correct.

The most striking example of this fact is that of a hollow hemisphere or cup-shaped body, which offers substantially four times as much resistance to motion with its concave side forward as with its convex side forward.

A practical application of this principle is to be found in the parachute, which comes down to earth at a relatively low speed because the relatively great air resistance encountered by a hemispherical shell with its open side to the wind. A mechanical device based upon the principle that air resistance varies with the form of the body consists of four cups or hemispheres mounted at the ends of a cross, which latter is pivoted so it can turn around its axis.

When the axis is being moved in a direction at right angles to itself, two of the hemispheres will be exposed to the wind with their concave, and two with their convex side, and since the resistance encountered by the former is much greater than that encountered by the latter, the "wheel" will turn.

Bodies which offer comparatively little resistance to high-speed motion through the air or other fluids are referred to as streamline bodies. A streamline body may be defined as a body producing, by its motion, streamline flow of the fluid surrounding it.

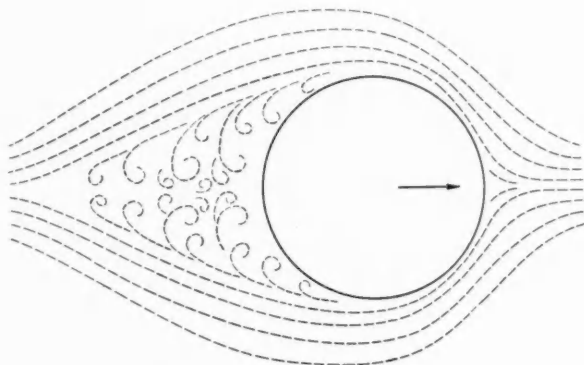


Fig. 1—Flow lines around a ball or cylinder, showing the partial vacuum and resultant eddies at the back, which are the cause of power loss + + + + +

The scientific definition of streamline flow is somewhat involved and this form of flow may best be thought of as the opposite of turbulent flow.

The distinction between these two possible types of flow was very nicely demonstrated by Osborne Reynolds, a British scientist, some fifty years ago. Reynolds caused water to flow through a glass tube, and at the center of this stream he introduced a colored liquid.

Under most conditions this colored liquid would form a very distinct straight line throughout the length of the tube, while under other conditions, particularly when the velocity of flow was high and the diameter of the tube large, the colored liquid was completely intermingled with the water.

In the first case there was streamline flow; in the second, turbulent flow. Reynolds found that the change-over from streamline flow to turbulent flow always occurred for a certain critical value of the expression $\rho v d / \mu$ where ρ is the density of the fluid, v , the velocity of flow; d , the diameter of the tube, and μ , the viscosity of the liquid. The value of this expression is known as the Reynolds number.

In the case of the fluid with which we are concerned here, atmospheric air, the density and viscosity vary only slightly (with the atmospheric temperature and pressure), and the only variables of importance are the air velocity and the linear dimensions of the moving body.

There is, of course, considerable difference between a fluid passing through a tube and a solid body moving through a viscous fluid, but the same fundamental principles hold in both cases.

Let us consider a sphere moving through the air, as illustrated in Fig. 1. By the forward motion of the sphere the air is forced aside in fairly definite flow lines, as indicated in the drawing. Behind the sphere

Lies in Power Economy at High Speeds

the flow lines close in again, but if the sphere moves at a rapid rate, these flow lines cannot close in sufficiently rapidly to keep the space immediately behind the sphere filled to atmospheric pressure. There will then be a partial vacuum in this space, and when this vacuum is being filled up by the pressure of the atmosphere, eddies are formed, as indicated in the diagram. The formation of the partial vacuum consumes power, and this power must be supplied in moving the body. The potential energy of the vacuum is converted into kinetic energy when air swirls or eddies are created in the space, and the energy is finally converted into heat by the friction encountered by these eddies.

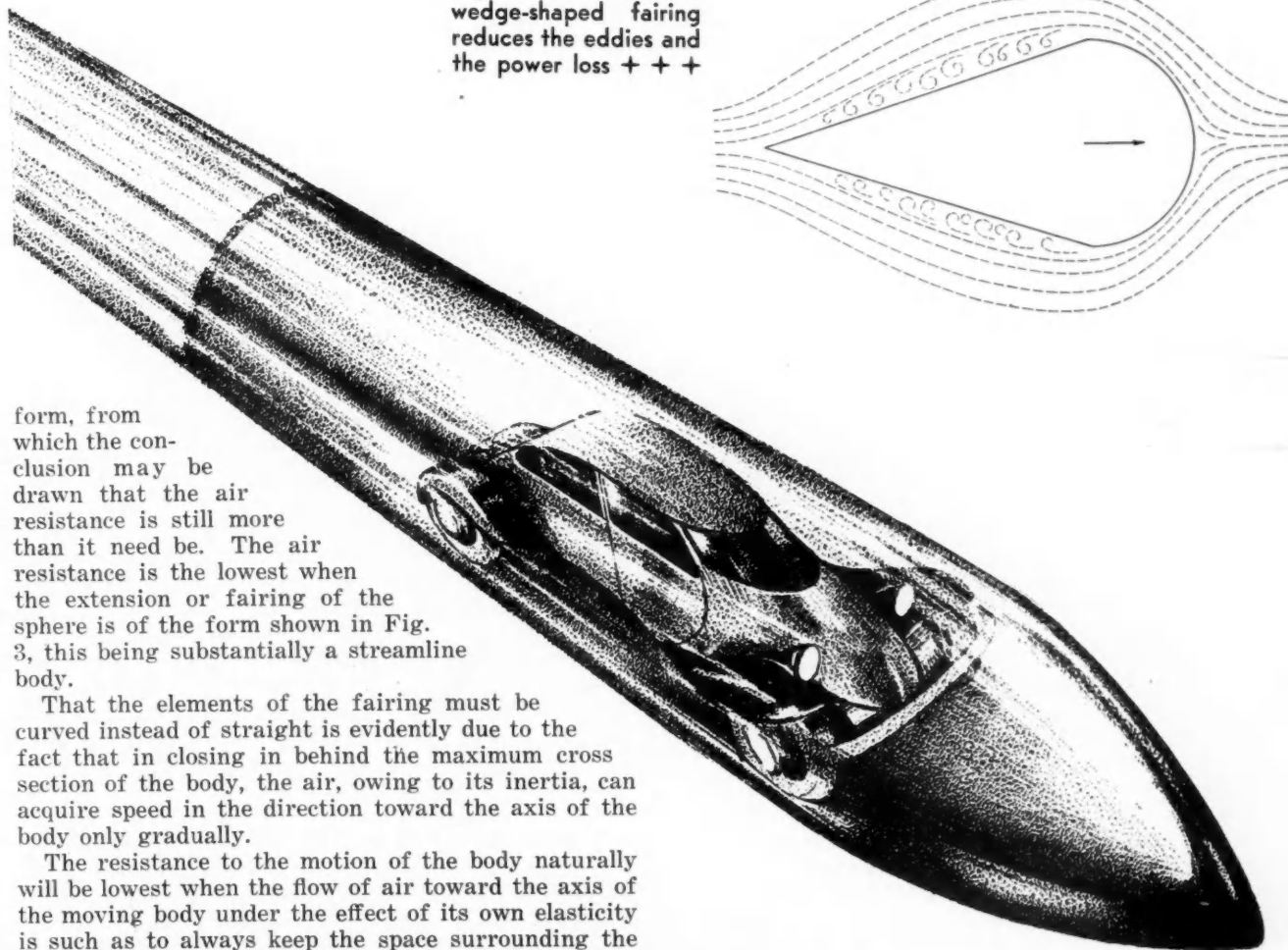
If a conical extension is applied to the rear of the sphere, as shown in Fig. 2, there is much less chance for the formation of a partial vacuum in the wake of the sphere. However, there will still be a slight under-pressure near the conical wall, and slight eddies will

the formation of regions of low pressure and consequent eddies.

That for minimum air resistance the front end of the body must be blunt instead of sharp has been a puzzle to many, and the writer remembers hearing a builder of a racing car some years ago contesting this viewpoint, his argument being that "when you want to cut cheese you don't use the back of the knife." Unfortunately for this argument, the parallel is not a valid one. In driving a body through the air, by far the greater part of the energy consumed is what is called dynamic loss. That is, you set air in motion, thereby imparting energy to it, and practically none of this energy is recovered. Kinetic losses do not enter in cutting cheese.

There also has been some question as to why the loss should be less with a blunt head than with a sharp conical head. One explanation that has been offered

Fig. 2—Conical or wedge-shaped fairing reduces the eddies and the power loss + + +



form, from which the conclusion may be drawn that the air resistance is still more than it need be. The air resistance is the lowest when the extension or fairing of the sphere is of the form shown in Fig. 3, this being substantially a streamline body.

That the elements of the fairing must be curved instead of straight is evidently due to the fact that in closing in behind the maximum cross section of the body, the air, owing to its inertia, can acquire speed in the direction toward the axis of the body only gradually.

The resistance to the motion of the body naturally will be lowest when the flow of air toward the axis of the moving body under the effect of its own elasticity is such as to always keep the space surrounding the body filled to atmospheric pressure, thus preventing

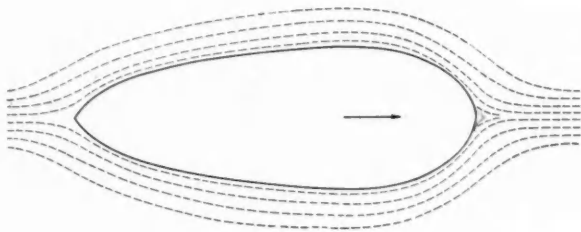


Fig. 3—Showing the smooth flow lines around a streamlined body. This may be either a body of revolution, like a balloon, or a body of uniform section of the shape shown + + + + + + + + +

is that when the head is made long and pointed, as shown in Fig. 4, the skin friction is greater than in the case of a blunt head as shown in Fig. 5. That the skin friction is greater in the first case is evidently inferred from the fact that the length of the path of contact between a particle of air and the head is greater in the first case. This, however, does not explain why the air resistance is greater also for a conical head of the same depth as the rounded head, although in this case the length of the path of contact is less with the conical head.

The true explanation is that with a conical head a definite constant velocity in a direction radial to the axis of the head is imparted to the air coming in contact with it, and the air still retains this velocity when it reaches the maximum cross section of the body. The result is that a partial vacuum is formed at the surface of the body immediately behind the maximum cross section, and this in turn results in the formation of eddies, which consume power. The correct form of the head is substantially a paraboloid, as this will give a maximum radial velocity to the air at the very beginning of contact and allow this velocity to be reduced at a constant rate (due to the elastic force of the atmosphere, which is constant), so the velocity will vanish at the moment the air reaches the maximum cross section of the body.

It is evident that bodies of revolution, that is, bodies of which all sections through the axis are identical, can be streamlined best. Bodies of this form are used in aircraft work for engine nacelles and when pumps, generators, etc., are driven by a propeller placed in the air stream. However, many of the parts of airplanes exposed to the air stream cannot be bodies of revolution, such, for instance, as the wings and the struts. All such bodies are given a cross section that assures streamline flow over them.

In applying streamline principles to automobile bodies three courses are open:

First, the whole body may be made in the form of a body of revolution, blunt in front and coming to a point at the rear, with the lower parts of the wheels and possibly some other parts projecting.

Secondly, the body may be made of such form as to have a horizontal cross section of streamline form.

Thirdly, it may be given a vertical section of streamline form.

Of course, under the second and third plans, the bodies would not be made with constant horizontal and vertical cross sections respectively; what is meant is that under the second plan the horizontal sections at different heights correspond more nearly to streamline

forms than vertical sections at different distances from the fore and aft axis, while the opposite holds true in connection with the third plan.

Any of these forms, of course, would depart greatly from the conventional lines of passenger cars. A compromise type that would involve less of a change from accepted forms would comprise a lower part, below the "belt line," which is essentially a section of an air foil or a thick wing of an airplane, and a superstructure of streamline shape in horizontal section.

The effect of streamlining on air resistance is measured by the value of the coefficient of drag c in the equation

$$R = c A V^2 \text{ lb.,}$$

where R is the air resistance; c , a coefficient; A , the forwardly projected area in sq. ft. and V , the velocity in miles per hour.

The coefficient c is not constant but varies with the form of the body and also with its projected area, as well as, to a slight extent, with atmospheric conditions. For very large flat plates moved straight on against the wind the coefficient tends to assume a limiting value of about 0.0033, according to wind tunnel researches by Eiffel. For smaller plates it has a lower value. For solid bodies the value of the coefficient varies with the Reynolds number.

For a very wide range in values of this number the value of the coefficient for spheres lies between 0.00102 and 0.00113. For a fully streamlined body Jaray has given a value of 0.00054. In connection with airplane members any projections from a streamline form may be assumed to add to the air resistance of the latter about as much as a flat plate of twice their projected area, this being due to "interference," that is disturbance of the smooth flow of the air over the streamline body by the projections.

Smooth Surfaces Essential

Some interesting remarks on the subject of the influence of small asperities or projections on wing and fuselage coverings of airplanes on their speed were made by A. Verdurand in a recent article in *La Technique Moderne* dealing with present tendencies in aircraft design. Says M. Verdurand: "I wish to point out an interesting observation which has been made on metal airplanes. It has been found in practice that all asperities of the coverings of the plane have the effect of considerably reducing its speed.

"Even very small asperities, such as rivet heads, corrugations of the sheets, even though they are parallel to the direction of flight, produce an important braking effect. It is for this reason that manufacturers like Junkers, who employed corrugated sheet metal, and like Wibault, who assembled the covering sheets by means of interlock seams, have given up these practices in spite of their advantages from the production standpoint, and now use only perfectly smooth coverings."

In case of actual automobiles the value of the coefficient c in the air resistance formula is, of course, considerably greater than in that of streamline bodies. Jaray found that for modern closed cars the value of the coefficient varies between 0.0017 and 0.0018, so that it would appear that by "going the limit" in streamlining of automobile bodies about one half of the power now required to overcome air resistance could be saved.

What this amounts to may be shown by an example. Let us assume a car weighing with occupants 4500 lb.

and having a projected area of 26 sq. ft. The rolling resistance on very smooth roadways is only about 15 lb. per 1000 lb.

Hence the rolling resistance of this car is

$$4.5 \times 15 = 67.5 \text{ lb.}$$

and the horsepower required to overcome rolling resistance at 80 m.p.h.,

$$\frac{67.5 \times 80 \times 5280}{60 \times 33,000} = 14.4 \text{ hp.}$$

The air resistance will be

$$0.0018 \times 26 \times 80 \times 80 = 300 \text{ lb.}$$

and the horsepower consumed in overcoming air resistance,

$$\frac{300 \times 80 \times 5280}{60 \times 33,000} = 64 \text{ hp.}$$

Hence the total power consumed by this car at 80 m.p.h. is

$$64 + 14.4 = 78.4 \text{ hp.}$$

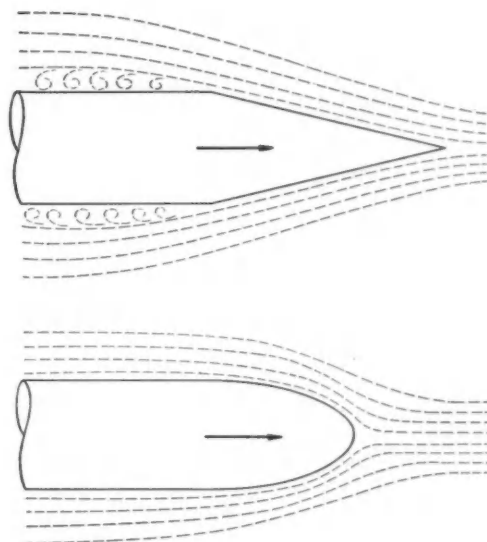
If the air resistance can be halved there will be a saving of 32 hp. with this car when traveling at 80 m.p.h. At 40 m.p.h., which is more nearly the present normal speed of travel, the horsepowers required for overcoming the air resistance with both the conventional and the streamline body would be only one-eighth as great, that is, 8 and 4 hp. respectively, and the saving would be 4 hp. or only one-eighth as great as at 80 m.p.h. It is evident from this that streamlining will gain in importance rapidly as traveling speeds are pushed up.

Aside from streamlining the car as a whole, it is, of course, also possible to streamline certain portions of it. It has been pointed out already that the wheels are the parts of a car which encounter the greatest air resistance, and for that reason in racing cars they are now often provided with streamline fenders.

It is rather difficult, however, to fit such fenders to

the front wheels in a car with rear mounted engine, as they are almost certain to interfere with the front doors. One way out would be to use only two doors, behind the front seat, the latter being made individual and spaced some distance apart, so these seats could be entered from the rear.

No direct entrance to the driver's seat may seem a great disadvantage; still, it must be remembered that many cars are being built in which the rear seats, which are generally considered the most important and the most comfortable seats, are entered in a precisely similar way.



Figs. 4 and 5—Showing why a body with blunt nose offers less resistance to motion through the air than one with sharp nose + + +

The Future of Diesel Fuel Oil

IN a well-reasoned paper on the Economic Aspect of the Future Supplies of Diesel Fuel Oil, read before the (British) Institution of Petroleum Technologists and printed in *The Petroleum Technologist* for November, 1930, the author, J. Kewley, summarizes his argument as follows:

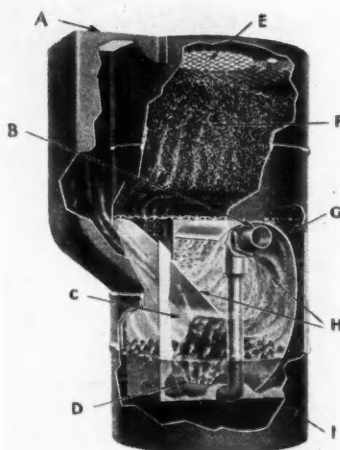
"There seems no reason for expecting any retardation in the expansion of the spark-ignition engine. However far the Diesel engine develops, it may be confidently expected that the gasoline engine will hold its own level with a more expensive fuel.

The competition for distillate fuels will result in a rise in price in comparison with gasoline. One of the main arguments for the Diesel engine is at present the lower price of the fuel. An increase in the relative price of this fuel must result in a retarding effect on the development of the Diesel engine. In the case of marine Diesels an increase in the price of fuels might well in many cases give the advantage to the steam turbine. Some state of equilibrium must eventually be reached, but the point at which this will be set up

is beyond the power of the author to predict with any degree of definiteness.

"One solution, however, does present itself, or rather one direction for future development is clearly indicated. There is a relative abundance of residual fuel. The spark-ignition engine cannot use this, but the engine of the Diesel type can. The only competitors for residual fuel are the steam raisers and heat generators, and these have always coal available. The day may come when the dream of Dr. Diesel will be realized and powdered coal will be the standard Diesel fuel. Meanwhile, the intermediate step seems to be the evolution of a type of engine which will burn successfully the residual petroleum fuels for which the competition can never become fierce as long as there is abundance of coal and which may certainly be expected for long years to come to be the cheapest petroleum product. The development of the Diesel engine to substantiate the makers' claims as to its capacity for running on residual fuels appears to the author to be the line most clearly indicated."

Imperial Air Cleaner Is Oil Type With Removable Reservoir at the Bottom



In this illustration of the United Imperial oil-type air cleaner

A is the air inlet; B, the pipe through which the exhaust gases enter; C, the washing chamber; D, the slotted pipe from which jets of exhaust gas are emitted; E, the air outlet to the carburetor; F, the filter element; G, one of the low-pressure passages through which the oil passes from the filter to the reservoir; H, a pair of baffles, and I, the removable oil reservoir

IN the design of the new United Imperial air cleaner, announced by the United Air Cleaner Corp. of Chicago, account was taken of the various requirements made of air cleaners in automotive service, including high efficiency throughout the range of engine operation, low restriction, freedom from tendency to become choked, and independence of weather conditions.

The United Imperial cleaner is an oil cleaner, but differs from others of this type in the principle employed, which consists in raising continuous screens of oil by means of power taken from the exhaust. The action therefore is not dependent on the air velocity mixing the air and oil. As soon as the engine starts, exhaust gas is led into the lower chamber immediately below the oil level, and a curtain of oil or oil spray is raised into the air stream. All of the air entering the carburetor is compelled to pass first through this oil spray, and it is then carried through a chamber containing kinked

wire, where practically all of the dust still remaining in it is removed. Tests are said to have shown an efficiency of more than 99 per cent, and that with but little restriction on the air flow.

Dirt taken out by the primary cleansing settles at the bottom of the oil reservoir provided at the bottom of the cleaner. The upper chamber, containing the loosely packed kinked wire, is provided with drain-backs which are not in the path of lowest depression. Through these drain-backs the

oil, together with the slight amount of dirt not caught in the primary cleansing, passes to the reservoir below. The chamber of kinked wire also serves to separate the oil from the air particles before they pass to the carburetor.

The constant circulation of hot oil through the wire filter is said to make the filter self-cleansing, and to make it capable of continuous operation without servicing. The cleaner has no moving parts.

Electric Oscillations Help Lower Nitriding Temperature

WHAT may prove to be an important discovery in connection with the nitriding of steel was described in a note presented to the French Academy of Sciences by M. Leon Guillet, director of the Ecole Centrale Polytechnique. The discovery was made by M. Guillet's assistant, M. Mahoux, when carrying out some experiments in the laboratory of the Conservatoire des Arts et Metiers.

M. Mahoux found that the rate of nitriding is greatly increased when high-frequency electric oscillations are passed through the furnace. If under certain conditions the depth of nitriding could

not be more than 0.01 mm., electric oscillations increased it to 0.35 mm. The hardness and tensile strength of the steel also were greatly increased under the influence of the electrical oscillations. A similar effect was noticed on chromium and nickel, which, instead of merely adhering to the steel, were absorbed into it under the influence of the electrical oscillations. M. Guillet believes that definite frequencies will be found most effective for each element which is to be absorbed into the steel, and he thinks that with the aid of electrical oscillations the temperature of nitriding may be still further reduced.

PRODUCTION LINES



Aseptic and Safe

60 per cent reduction in accidents involving lost time in 1930 as compared with 1929. A. U. Widman (w.m.) points proudly to this record at Cadillac. Back of this record is a continuous and intensive safety drive. Among other things is the adoption of shatter-proof glass shields to replace goggles on metal cutting machines. More than 300 machines have been thus equipped. Cutting fluids are being treated with disinfectant. All infection claimed to be eliminated thereby.

Whose O.K. Counts?

Judging by the queries aimed at this desk, some are not conscious of the revolution in buying habits in automotive plants. Time was when some single individual was king when it came to buying anything. To a great extent that's old stuff. Buying today is a more logical, more scientific proposition. You might call it "conference buying." A general getting-together of everybody concerned. Sometimes three individuals, sometimes ten or twelve with a final O.K. by the chief. Moreover the buying influence may start with any one of these. But no matter where it starts it has to pass the acid test of a conference group.

Automotive Industries

What Gage, Please?

One of the best little booklets sent out by the Bureau of Standards in a long time is Circular No. 391—"Standard Thicknesses, Weights and Tolerances of Sheet Metal—Customary Practices." Tables for iron and steel sheet and plate; non-ferrous plate, sheet and strip. Gives stock thicknesses, weights, manufacturing tolerance and other data. Not a book of standards—but a survey of current practice. Includes for comparison foreign sheet and plate gages. Better than handbook stuff.

A Big Order

Thirty to 35 per cent of steel sheets; 50 per cent of the hot rolled strip; 65 to 76 per cent of all cold rolled strip is used by the automotive industry. According to figures released by the National Association of Flat Rolled Steel Manufacturers.

Cooperation

Somebody asked the other day how many production men get a chance to look over the new designs before they are asked to jam it out. One engineer opines it isn't more than one in ten. How does it sound to you? We are afraid to guess.

Time to Retire?

With the publication of the Bureau of Internal Revenue preliminary reports on depreciation studies, some interesting figures are made available. Note these depreciation rates. Broaching machines, 6 2/3 per cent; automatic checking machines, 5 per cent; heavy-duty drill, 6 per cent; turret lathes, 6 1/4 per cent; hydraulic press, 5 per

cent. Shades of old and worn-out equipment! What chance is there to reflect the higher current obsolescent rates? Can you pay for new equipment out of this?

Drills Are Important

Now there are drills and there are drills. Carbon steel, high speed steel, and alloy. Drills vary in price, accuracy and useful life. In most plants we've visited lately, the standards department specifies drills by name and grade for every job. It is considered too important today to leave to the discretion of the tool room clerk.

Belt Slippage Cured?

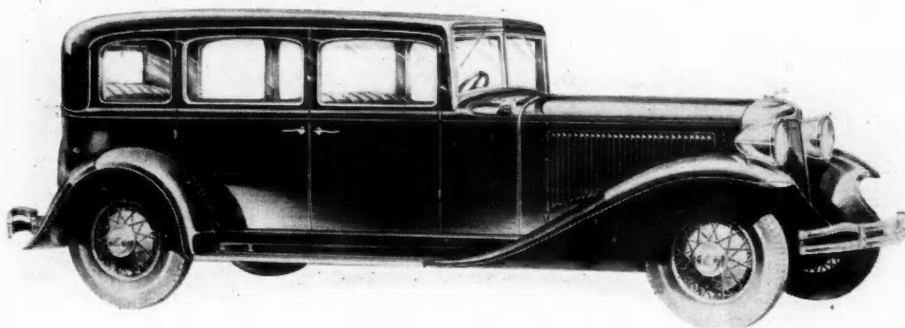
Wear and tear of belting goes with slippage on heavy pulls. Gripwell Pulley Covering is something new to replace belt dressing. It's a composition of specially prepared canvas. Contains neatsfoot and castor oil. The idea is to paste it on the outside of the pulley. Said to permit belt to run one-third slacker under full load without idlers.

As It Is

When it comes to machine tools, isn't the shop executive mainly concerned with—productivity in proportion to demand. Obviously the best way to cut cost is to produce more in a given time with less labor and a smaller floor space. Provided it pays to buy that new machine at any price. Just as sure as fate, a new machine that fills this bill is going in. Regardless of what anybody may say about obsolescence and depreciation.—J. G.

MANUFACTURING
MANAGEMENT
METALLURGY

May 16, 1931



Chrysler eight De Luxe four-door sedan, listing at \$1,565, showing the Vee-shaped double windshield along the lines of the Imperial eight

Chrysler New De Luxe Series Has Cast Iron Brake Drums

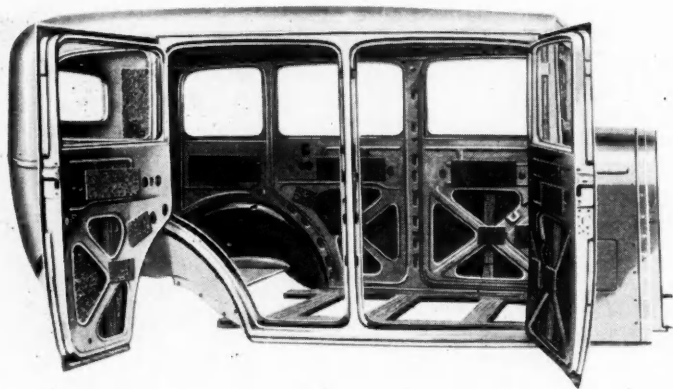
FIVE new body models, designated as the De Luxe series, and a considerable number of mechanical improvements, are announced by the Chrysler sales Corp. for the Chrysler eight chassis. Prices of the new models range from \$1,525 to \$1,970.

In appearance the new models follow closely the lines of the Imperial eight, the distinctive features in-

cluding a double Vee-shaped windshield with chrome-plated framing, five wire wheels as standard equipment, these being of the new small 17 in. size with 6.50 in. tires, individually mounted instruments, interior sun visors, etc. Four wood wheels are optional.

The important mechanical changes and improvements which have been made in the Chrysler eight since the first of the year include the adoption of cast-iron brake drums, recently introduced by Holley Permanent Mold, Division of Holley Carburetor (see *Automotive Industries*, June 21, 1930, page 956), another increase in bore, to 3¼ in., for a displacement of 282 cu. in. and a maximum rating of 95 hp. at 3400 r.p.m., the adoption of a five-point engine mounting, new manifolding, heavier axle shafts, a fully counterweighted crankshaft, larger piston pins, larger axle shafts, increased front and rear tread, increased cooling system capacity, new small-size 14 mm. metric spark plugs, an additional frame cross-member, longer front springs, and increased tire section.

Closed models are upholstered in Bedford cloth, open and convertible cars in genuine leather. Seat cushions have Marshall type springs. In the front seat construction, the frame is anchored to the body side pillars, to provide an additional body brace. The back of the seat is of the telescoping



Skeleton of a Chrysler De Luxe eight sedan, showing the application of hair felt, or jute padding, to the all-steel body to reduce vibration and noise. Main body panels are sprayed with a deadener. Similar treatments are used in other body models of the line + + + + +

Specification of New and Old Chrysler 8

	New	Old		New	Old
Bore	3 1/4	3 1/8	Spark advance, au-		
Displacement	292.1	260.8	tomatic	14°—	18°—
Taxable hp.	33.80	31.25		2075 r.p.m.	3000 r.p.m.
Maximum hp.	95—3400	88—3400	Tire size	6.50/17	5.50/18
Compression ratio,			Rim size	17 x 3/12	18 x 3/25
standard	5.2	5.3	Cooling capacity ..	4 1/4 gal.	4 gal.
optional	6.2	6.3	Rear axle ring gear		
Number of points			teeth	43	41
suspension	5	4	Shaft dia. at bear-		
Crankshaft coun-			ing	1 7/16	1 3/8
ter weights	8	none	Overall length		
Crankshaft weight ..	87 1/2	69 1/2	with bumpers ..	187 9/16	186 1/16
Pistons, weight ..	1.10 lb.	1.00 lb.	Tread, frnt	56 5/32	55 7/8
With rings and			Tread, rear	58 7/32	58
pins	1.52	1.37	Frontspring length ..	38	35 3/4
Piston-pin			Shackle type	rubber and oil-less bush-	
diameter	55/64	47/64	ings		
Rod bushing length ..	2 3/4	2 9/16 in.	Steering gear ratio ..	15.5	16 to 1
Spark plugs type ..	14 mm.	18 mm.	Castor angle	1°	1 1/2 to 2°
			Number of horns ..	1	2

Prices and Gear Ratio

	New De Luxe	Std. 8	Axle Ratio
2-4-Pass. Coupe	\$1,525	\$1,495	3.91
5-Pass. Coupe	not in production yet		4.30
2-4-Pass. Roadster	1,545	1,595	3.91
5-Pass. Four-Door Sedan ...	1,565	1,525	4.30
2-4-Pass. Convertible Coupe	1,585	1,665	3.91
5-Pass. Phaeton	1,970	1,970

type to provide adjustment, over a range of 3 1/4 in.

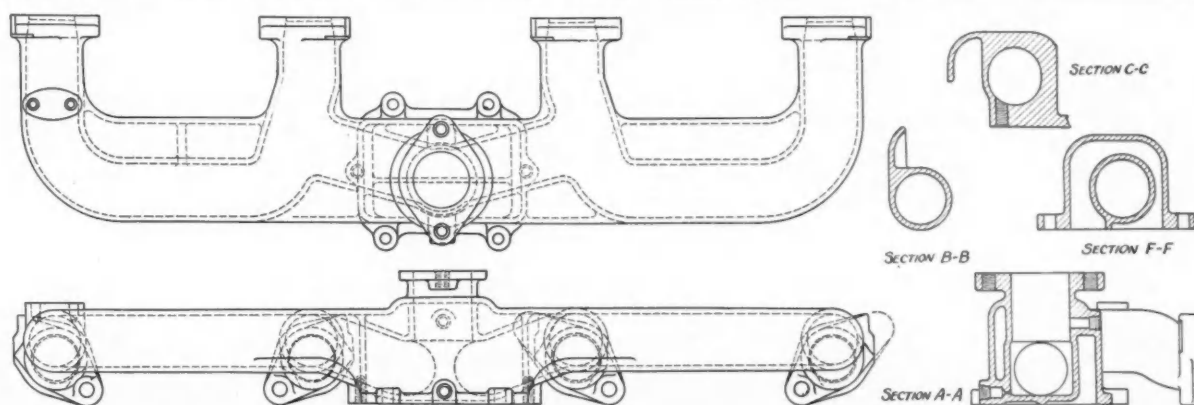
Smoking sets are built into the rear compartment arm rests. Dome lights are controlled both by a door-operated switch and a toggle switch on the right center pillar.

Originally introduced with a bore of 3 in., the Chrysler eight has been stepped up twice for a total increase of approximately 13 hp., according to the manufacturer's figures. In its latest form, this eight-cylinder engine is smoother than any of its predecessors, due to the combination of a new combustion chamber, a new and interesting manifold layout, the adoption of a counterbalanced crankshaft and the aforementioned five-point engine mounting.

The cylinder head is of the latest Janeway (offset) type with a compression ratio of approximately 5.2

to 1 and the standard and 6.2 to 1 for the high compression optional head. New small size 14 mm. plugs are used, for better protection against preignition. The new intake manifold is illustrated herewith. The former intake manifold was of the dual type with one branch supplying the four central and the other the four outer cylinders. As formerly, a single venturi downdraft carburetor is used. In the new design there is a smaller space below the venturi, this space being at a somewhat lower level than the rest of the manifold so that unvaporized fuel will drain back to this point, where the hot-spot is located.

From the hot-spot space two short branches connect up to the manifold U's on opposite sides. Instead of being of the equi-flow type, however, with all cylinders the same distance from the carburetor, the carburetor connection is brought in at right angles to the manifold at the point of connection. Incoming gases, therefore, are probably compelled to make a right-angled turn to the left and right to supply the outer two or inner two cylinders, as the case may be. Chrysler engineers state that with this design distribution is decidedly improved; in fact, no further gain has been found possible through a decrease in manifold diameter (a common remedy for poor distribution, at the expense of power loss). (Turn to next page, please)



The new intake manifold on the Chrysler De Luxe series provides a drawback for unvaporized fuel

The provision of counterweights on the crankshaft is effective in materially reducing bearing loads, providing a higher factor of safety for high-speed operation, by lowering the oil temperature.

Five-point engine mounting has been adopted mainly to provide a more rigid support of the engine on the frame. In addition to the usual four supports, a central support is located approximately under the rear main bearing, and takes all the engine weight at the rear. This support is located on the frame cross-member just ahead of the flywheel housing.

With this arrangement, a fairly soft rubber block can be used for the supports on the frame side rails, giving a decidedly more effective insulation of the

frame from the vibrations that come from the engine.

Other engine and chassis changes appear in the accompanying table of specifications. The bodies are notable for the pains which have been taken to assure effective noise and heat-insulation in them. The cowl is lined with layers of hair-felt and jute, the dash with jute, loose-grain wood fibre board, and a liner of KB wood close-grain fibre board. Floorboards are also lined with insulite. Body panels are sprayed throughout with a "deadener," while the accompanying illustration shows the location of a number of points on the body metal work where jute and hair-felt pads are located for noise-reducing and insulating purposes.

Oil-Fired Industrial Oven Heater

IN order to permit plants preferring oil as fuel to avail themselves of the advantages of recirculation of oven air and incineration of inflammable and explosive vapors, the Paul Maehler Co., Chicago, manufacturers of industrial ovens and heaters, is now manufacturing an oil-fired heater. Known as the Oil-Fired Maehler-Universal heater, it operates along the same general lines as their gas-fired model. The heated air from the heating chamber is forced by the blower at the outlet end of the heater into the oven, creating a slight plus-pressure, which distributes the heat evenly throughout the oven, providing uniform temperature at all points.

Recirculating air, drawn from the oven at a high temperature, is reheated and tempered with a controlled volume of fresh outside air. Thus the heated air in the oven is not wasted but used over again and the heater is required to raise the temperature but slightly. In this manner, also, explosive vapors are drawn from the oven and incinerated in the heater instead of being allowed to collect in the oven.

The burner and blower equipment are simple in construction and are said to require a minimum of attention. For this reason, the heater may be located at any desired point above, beside or below the oven, with the control apparatus wherever convenience dictates. The all-bronze burner, provided with a self-flush adjustment, is designed to provide perfect combustion of fuel oil and deliver clean heat while the heating chamber is constructed to prevent heat loss. Flame spreaders insure uniform heating of all circulating air passing through and complete combustion of all inflammable vapors.

The remote control cabinet is equipped with a Bristol temperature controller which regulates the oil flow to provide uniform oven temperature, and may be set for any desired temperature over a wide range.

A gas pilot is kept constantly burning and an electric match operates intermittently to relight the pilot in event it is extinguished. An oil scrubber is used in the feed lines and protection against fire, or explosion due to failure of oil, air or electricity, is provided by a series of safety devices which close all valves and shut off the power in event of such a failure. Manual operation is necessary to start the heater again after such a shutdown. A special by-pass around the controls maintains a low flame, however, when the temperature control closes.

The heated air is delivered at the top of the oven and withdrawn from the bottom, eliminating dust and dirt-catching pipes or radiators inside the oven, and making the entire oven area available for productive work.

The oil-fired heater is available at present in five sizes with an air delivery capacity of 3000 to 12,000 cu. ft. per minute and a B.t.u. delivery of 450,000 to 3,000,000.

European Ford Activities Are Weathering Depression

(Continued from page 761)

cover that, in turn, the Government forbade the consummation of the arrangement.

"We have no reason to believe that these actions indicate any animus against our company in particular. I am merely reporting the present position of impasse, as I believe it to be my duty to do so. Probably an explanation is similar to that given in Shakespeare by Brutus concerning the death of Caesar, which might be paraphrased: 'Not that I love Ford less, but that I love Rome more.' Meanwhile, we have substantial investments in Bologna, Naples, and Genoa, and we are carrying on to the best of our ability," Sir Percival reported.

Stackbin Corporation

THE Stackbin Corp., Providence, R. I., has taken over the manufacture and sale of the entire line of nesting bins from the Simplex Tool Co. These products will in the future be known as Stackbins. The line at present comprises individual nesting bins and sectional type nesting bins. Additional products are contemplated being added in the near future.

THE French commercial vehicle manufacturer Vialle, at Lyons-Montplaisir, has under tests a new 72-passenger motor bus equipped with Continental eight-cylinder engine and an all-metal body.

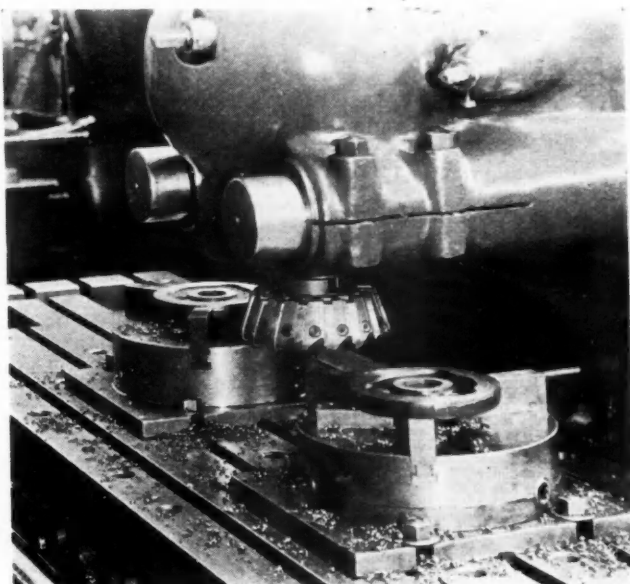
Milwaukee Stages Successful National Production Meeting of the S. A. E. With Varied Papers

(Continued from page 757)

cause a vibratory action, with the result that excessive wear will take place on the cutting edges. Fixtures for successful tungsten carbide milling should be of the semi-automatic type, quick and fast, positive and fool-proof, and above all, strong and husky. Older fixtures do not usually incorporate these features."

So far as tool form is concerned, the author concludes, "that the rake and clearance angles for tungsten carbide turning tools should be reduced slightly from the conventional angles used for high-speed steel. This same practice is carried out for milling cutters. In Fig. 3 is shown a typical cutter designed for the machining of soft, or medium, cast iron. The face angle is shown as 6 deg., the rake angle is 3 deg., and the bottom clearance is 3 deg. The angle on the periphery, or outside diameter, should be sufficient to clear the work so that the heel of the blade will not drag. Usually 5 deg. will suffice. These angles can be altered slightly one way or the other without any serious variations in cutting efficiency, life between grinds, or horsepower consumption. For example, the rake angle could be reduced to 1 deg. and the face angle increased to 8 deg. without any material change. However, the angles shown have proved successful when consideration is made of finish and general cutting characteristics.

"The angles shown for soft or medium cast iron can also be used successfully for the milling of malleable iron. Aluminum and yellow brass require greater face angles. The average design for these materials would be a rake angle of 3 deg., and a face angle of 10 to 15 deg. The bottom clearance for brass should be approximately 4 or 5 deg., and for aluminum, 5 or 6 deg."



In connection with the milling of steel, tantalum carbide has proven satisfactory + + + +

From all tests that have been conducted to date, it appears that the increase in speed and feed over high-speed steel will be approximately 100 per cent. In other words, if a high-speed steel cutter is operating at 70 ft. per minute with a feed of 6 in., it is quite possible to assume that tantalum carbide will run somewhere between 140 and 160 ft. per minute at a feed of 12 in. per minute. An actual example of this contrast is obtained in the milling of forged steel gear blanks, made of S.A.E. 3140 steel, which require the removal of 1/16 in. of material on each side. The steel is tough and hard, and ordinarily is machined at 75 ft. per minute with a feed of 6 1/2 in. With a tantalum carbide cutter, the speed has been increased to 170 ft. per minute, and the feed to 14 in. per minute. The setup is shown in Fig. 7.

Bigger Discounts Would Bring Wilder Trading, Dealers Say

(Continued from page 752)

And so it goes. But through the whole investigation the idea constantly is forced into the investigator's mind that more attention needs to be paid to the mental and emotional reactions behind the opinions which dealers express to factory representatives and a little less to the sheer logic or lack of logic evidenced.

We know one automotive man very close to both factory and dealer, for example, who two years ago was opposed to the junking plan idea because he had reasoned out logically that it was just an indirect way to increase the discount and because he felt that it was a circuitous means of accomplishing something that would be much more easily accomplished directly. After studying the matter in contact with dealers al-

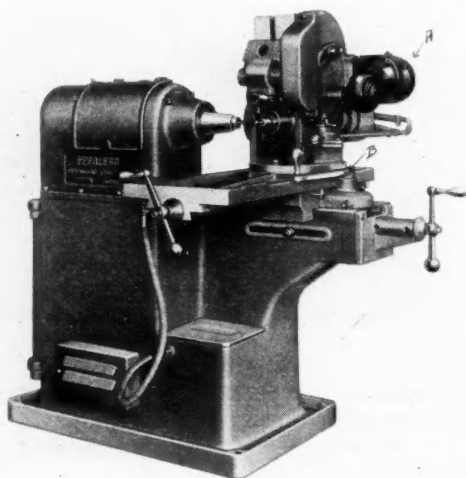
most constantly for two years, he is now a strong advocate of extension of the junking plan idea. He hasn't changed his logic a bit; he has simply come to the conclusion that most dealers like the junking plan idea; that they actually have a little more left than if they had the discount directly—even though they trade away some of their junking funds—and that a straight line in merchandising is not always the shortest distance between two points.

And more factory executives in parts as well as in the vehicle factories seem to be coming into agreement with his last conclusion, even though he may or may not be right as regards the particular matter of the junking plan itself.

NEW DEVELOPMENTS—AUTOMOTIVE

Machine Improved

ON the Model 3 Peerless Chamfering Machine recently introduced by the City Machine & Tool Works, Dayton, Ohio, the work head is now operated independently by a Master geared head reduction motor, as shown at "A." This eliminates all gearing and universal shafts formerly used in transmitting power from the machine motor

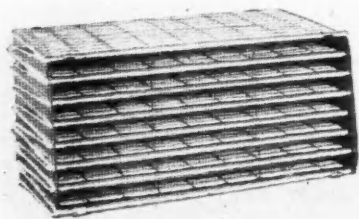


in base. This new installation provides a more flexible operation and method of changing speeds.

At "B" is shown a quick traverse to the work table which is offered as optional equipment, at small extra cost. This provides a means of reducing loading and unloading time, particularly on the chamfering of internal gears.

Independent Industrial Air Cleaner Uses Fabric or Fibrous Filter Medium

AN adaptation of one of the oldest principles of air filtration is contained in the "Compact" dry air filter announced by the Independent Air Filter Co., Chicago, Ill. It consists of a series of superimposed hinged wings, or panels, into which



a continuous sheet of fabric or fibrous filter medium is folded.

This air filter is said to incorporate the principle of low velocity air flow without sacrifice of space or cleaning efficiency. It is equally well

adapted to either fabric or fibrous materials and has made possible the use of a new and cheap cotton fabric filter medium that possesses all the advantages of wool felt, yet can be easily and cheaply replaced. The fabric is fed from large rolls into the filter units when the useful life of the filter medium is at an end.

Johnson Tube Welding Machine

COMPLETION of a new electric welding unit which greatly increases the range of steel tubing produced by the Johnson process is announced by Steel and Tubes, Inc., of Cleveland, a subsidiary of the Republic Steel Corporation.

After several years of experimental work, a machine has been developed which will weld tubing of much heavier wall thickness than has heretofore been possible and up to 5 in. in diameter. Sizes formerly direct welded in this manner ranged from No. 26 to No. 11 gage. The new unit electrically welds tubing up to 1/4 in. in thickness, increasing the wall range to No. 3 gage, all intermediate gages being included.

Gleason No. 12 Generator Tool Sharpener

FOR sharpening the tools used on Gleason straight bevel gear generators, and the 60 in. spiral bevel gear planing generator. The Gleason Works, Rochester, N. Y., has placed on the market the No. 12 generator tool sharpener. Only one grinding wheel is used to sharpen both tools for cutting the opposite sides of gear teeth. The only rotating parts are the wheel spindles and the pump, both driven by belt connection to the motor.

Tools can be ground to any side rake angles by loosening a nut on the tool-holder and turning the tool to the desired angle. The front rake angles can be obtained by a similar setting. In operation the tools are placed in tool-holders and moved across the edge of the wheel by hand. The feed into the



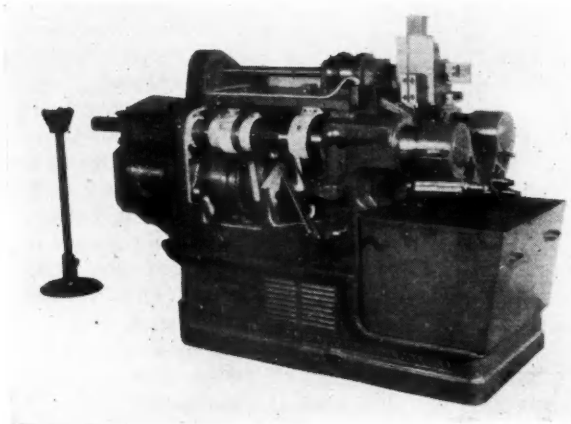
PARTS, ACCESSORIES AND PRODUCTION TOOLS

wheel is obtained by a hand wheel on the top of the bracket. Grinding is always against the cutting edges of the tools, thus minimizing the possibility of burning the cutting edges.

The wheel spindle is driven by 1 hp. constant speed motor of 1500 or 1800 r.p.m., mounted in the base of the machine. Floor space is 32 x 36 in. The net weight is 1500 lb.

New Britain Automatic Bar Machine

ACCORDING to a recent announcement the No. 38 single-spindle automatic chucking machine built by the New Britain-Gridley Machine Co., New Britain, Conn., has been slightly re-



designed to convert it into a bar machine that will take stock up to five inches in diameter. The makers now are prepared to furnish the necessary extra parts required for converting the chucking machine into a bar machine or vice versa. The bar machine is practically identical with the chucking machine, and has interchangeable parts, except for the hollow spindle required on the bar machine, the bar feeding mechanism which is mounted in a separate housing bolted to the rear end of the machine, an adjustable stop for the stock, and a few other minor parts.

Unusually heavy ball bearings in the spindle construction, in proportion to the capacity of the machine, constitute one of the important features of the new machine. Another feature is the collet locking mechanism which operates on a new principle involving the use of a large number of balls to obtain the required pressure for locking. The construction makes it possible to obtain a definite locking pressure that is perfectly balanced and also assures a very long life to the mechanism. Flood lubrication for the entire machine is supplied by a pressure pump. The entire hydraulic unit now is enclosed within the machine frame. The centrifugal pump for the cutting compound is driven directly by a motor.

Ordinarily there are two tool-holders which

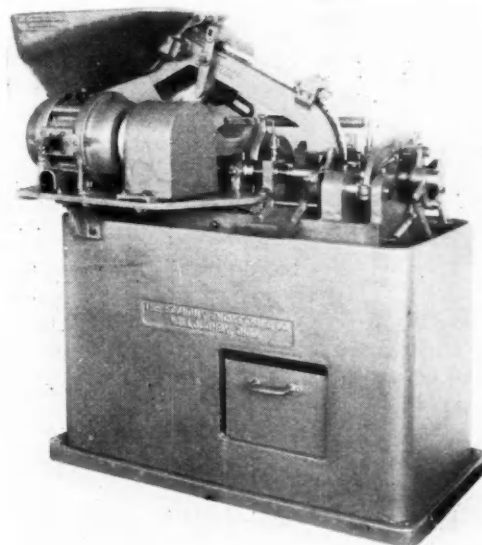
are moved longitudinally by slotted drum cams and fed into the work by a radial cam mechanism, the maximum longitudinal movement being 4 in. If required, a third tool-holder can be fitted above the work. The pusher which advances the bar and the work-holding chuck are operated mechanically by the mechanism mentioned as added at the rear end of the machine.

The rigidity of the machine contributes to the accuracy of the work performed on it, as does also the use of exceptionally large preloaded ball bearings on all shafts, including the camshafts.

The total weight of the bar machine is 8300 lb. It requires floor space 36 in. wide by 84 in. long.

Economy Type "B" Automatic Pointing Machine

AN output of 2000 to 3000 bolts or cap screws per hour ranging in diameter from 3/16 to 1/2 in. and in length from 3/4 to 4 in., is said to be the capacity of the Economy 1/2 in. automatic pointing machine, type B, according to a recent announcement by the Economy Engineering Co., Willoughby, Ohio. The operation of the machine is fully automatic, through the use of an improved mechanism, designed to insure a constant flow of work from the hopper to the roulette. The blank is positively gripped at the pointing station, the pointing head comes forward, automatically



pointing or chamfering, and finally the piece drops into the receptacle. This machine is available with either belt or motor drive.

The drive is from a 2 hp. motor, 1200 r.p.m. Required floor space is 30 x 50 in. The net weight is 2000 lb.

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Al-Lite Chain Hoist

THE Chisholm-Moore Hoist Corp., Tonawanda, N. Y., announces the first aluminum-alloy chain hoist—AL-LITE. According to the makers it is one-third lighter than other chain hoists, has fewer parts, unusual strength and efficiency. Only certified Alco aluminum alloys are used. First showing will be in Cleveland at the 2nd National Industrial Exposition, April 13-18.

Some of the many features of the new AL-LITE include lightness, strength, portability, Alemite lubrication, simple, rugged design, easy accessibility, hardened and ground ball bearings, planetary type gears, dust-proof housing, adjustable brake secure and positive in action, high efficiency, bright aluminum finish, corrosion resistant, "Inswell" chain, 50 per cent overload test, etc.

Thermoid Clutch Ring

A NEW heavy-duty clutch ring (clutch facing) specially designed for use on high-speed trucks and buses and in industrial units, has been placed on the market recently by the Thermoid Rubber Co., Trenton, N. J. The heat-



resisting qualities of the ring are said to be very high, and tests are said to have shown the new ring to be particularly free from glazing, swelling, grabbing and slipping.

Delco Thermo-Couple Switches

THE Delco Aviation Corp., Dayton, Ohio, a division of the Bendix Aviation Corp., has just brought out two thermo-couple switches to be used in connection with engine-temperature indicators on two- and three-engine planes. They will be known as AS-1001 and AS-1002, respectively.

Silver contacts in the switch reduce the drop in voltage to the minimum and terminals are pro-

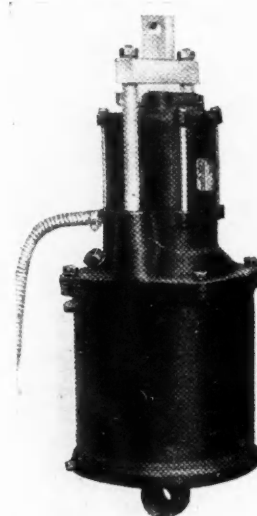
vided for connecting one instrument to two or three engines. The mounting dimensions are the same as those of the small standard switch. It weighs six ounces.

The Thrustor— New Control Device

THE CR-9504 thrustor, an interesting industrial control device, has been announced by the General Electric Co., Schenectady, N. Y.

The thrustor takes the place of large alternating—or direct current magnets and solenoids and may also be used to replace air cylinders where quiet and smooth upward thrust is desired

through a given distance. It consists of a motor-driven centrifugal oil pump, the impeller of which is mounted in a piston and driven by means of a spline shaft. This arrangement permits the stationary mounting of the motor. The normal position is with the piston at the bottom of the cylinder which is approximately $2/3$ full of oil. When energized the motor drives the impeller creating a pressure between bottom of the piston and bottom of the cylinder.



The thrustors are rated on the stalled thrust basis; that is, the number of pounds they will balance when the motor is running at full speed. The three standard sizes give 200, 300 and 600 lb. push. The speed of operating is slower than that of a solenoid, but is relatively fast. The motors used are small, $1/4$ to $1/2$ hp., and therefore come up to speed very rapidly (in approximately 0.1 of a second).

The device can be applied to brakes, clutches, door and window openers, spot welders, pumps and other places now filled by solenoids and air cylinders.

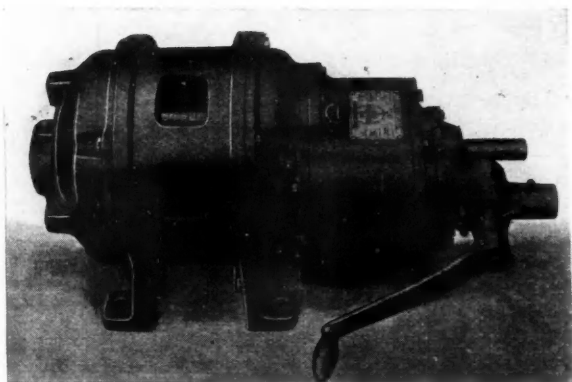
Lincoln Improved Electrode for Stainless Steel

STAINWELD "A," a new, improved electrode for the arc welding of stainless steel has been placed on the market by The Lincoln Electric Co., Cleveland. It will be available in $3/32$, $1/8$, $5/32$, $3/16$, and $1/4$ in. sizes in the regular 11 in. length.

It is an extruded electrode used with usual polarity of welding current reversed. The coating contains no carbon, often used as an arc stabilizer. This eliminates all possibility of the molten weld metal absorbing carbon from the electrode coating during the welding process.

Combination Multi-Speed Drive and Motor

A MULTI-SPEED reduction gear unit built in combination with a standard a.c. motor has been developed by the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. Constructed to give four different speeds to the output shaft at constant horsepower, this unit, known as the Westinghouse-Wise Multi-Speed Drive, is applicable to those many industrial oper-



ations which, for highly efficient performance, require drives providing more than one speed. With this drive the speed of the driven apparatus may be changed instantly while the motor is running at full speed and under full load. All gears are constantly in mesh, and in no way can the operator injure the unit by changing speeds at any time. This gear unit is mounted on a standard squirrel-cage Westinghouse induction motor. It is offered in three units, ranging in rating from $\frac{1}{2}$ to $7\frac{1}{2}$ hp. The four speeds available in the gear drive itself, plus the availability of motors giving different driving speeds, make it possible to choose a combination that covers a wide range of speeds.

Thermoid Car Heater Hose

THERMOID RUBBER CO., Trenton, N. J., announces a new type of car-heater hose which is said to have been approved by car-heater manufacturers. It is furnished in three forms, viz., six 5-ft. lengths, six 7-ft lengths in a coil, and 50-ft. lengths.

64A-Type Gear Shapers

THE Fellows Gear Shaper Co., Springfield, Vermont, has added a new line of Gear Shapers known as the 64A-type and bearing the following designating numbers: 64A, 624A, 624A-3, 645A, and 645A-3.

These machines, fundamentally, are of the same construction as the standard 6A and 6A-3-types, with the exception that a new apron of more massive design to accommodate a large work spindle is used so that gears integral with shanks can be cut. The work-spindle has a large straight

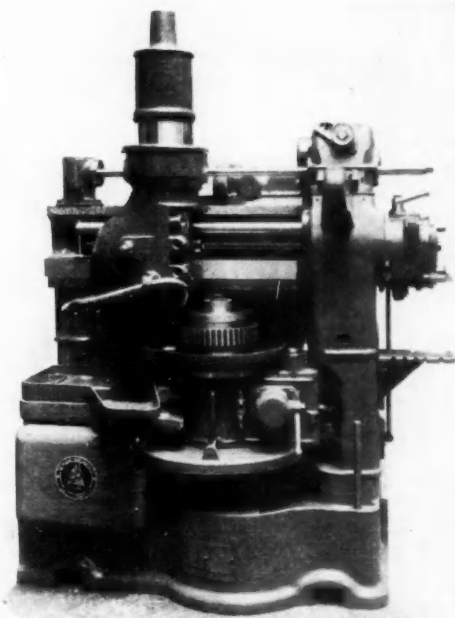
NEW DEVELOPMENTS Automotive Parts, Accessories and Production Tools

hole $5\frac{1}{8}$ in. in diameter passing completely through it. This work-spindle can be arranged with sleeves to hold shank gears having a maximum shaft diameter of 5 in., or with an adapter to fit standard reverse taper work arbors. Other features, incorporated in these machines are: A hardened and ground plate on the base for the apron bearing; grease pressure cup lubrication for apron, work-spindle, apron bearing angle block and apron pivots.

The capacities of Nos. 64A, 624A are: 18 in. external and internal spur gears, 5 in. face external, 3 in. face internal. The 64A is adapted to the use of both 3 and 4 in. pitch diameter cutters with $1\frac{1}{4}$ in. hole; whereas the 624A can only use 4 in. cutters with $1\frac{3}{4}$ in. hole.

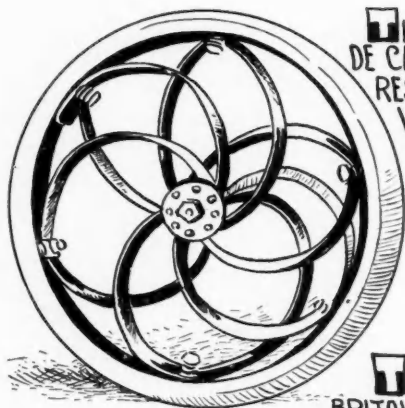
The capacities of No. 645A are the same as for Nos. 64A and 624A, with the exception that this machine is adapted to the cutting of helical and herringbone gears in addition to spur gears. Helical cutters used on this machine are $3\frac{1}{2}$ in. pitch diameter, $1\frac{1}{4}$ in. hole, and spur cutters 4 in. pitch diameter with $1\frac{1}{4}$ in. hole.

Nos. 624A-3 and 645A-3 have the same capacities as the others, but are limited to the cutting of gears having a maximum face width of 3 in.



The 624A-3 is adapted to the cutting of spur gears only; whereas the 645A-3 will cut spur, helical, and herringbone gears. Maximum pitch for spur gears is $\frac{3}{4}$ diametral, and $\frac{5}{7}$ diametral pitch for helical gears. The 64A-types with the 3 in. maximum face width capacity are especially recommended for heavy-duty production work as they are supplied with a one-piece cutter-spindle and saddle of exceptionally rigid design.

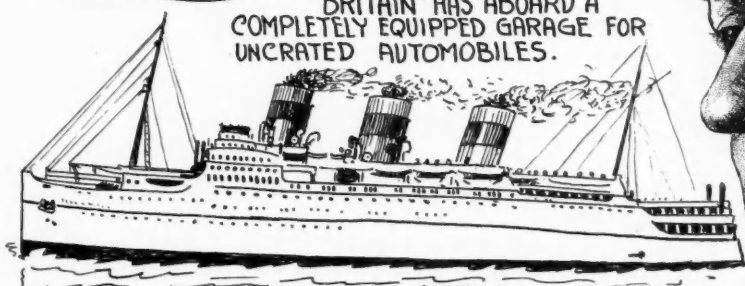
Automotive Oddities—By Pete Keenan



THE
DE CADIGNAN
RESILIENT
WHEEL
1905.



"WILD BILL"
HUDSON
MADE 489 SEPARATE
FLIGHTS IN ONE DAY.
Akron, Ohio, 1930.

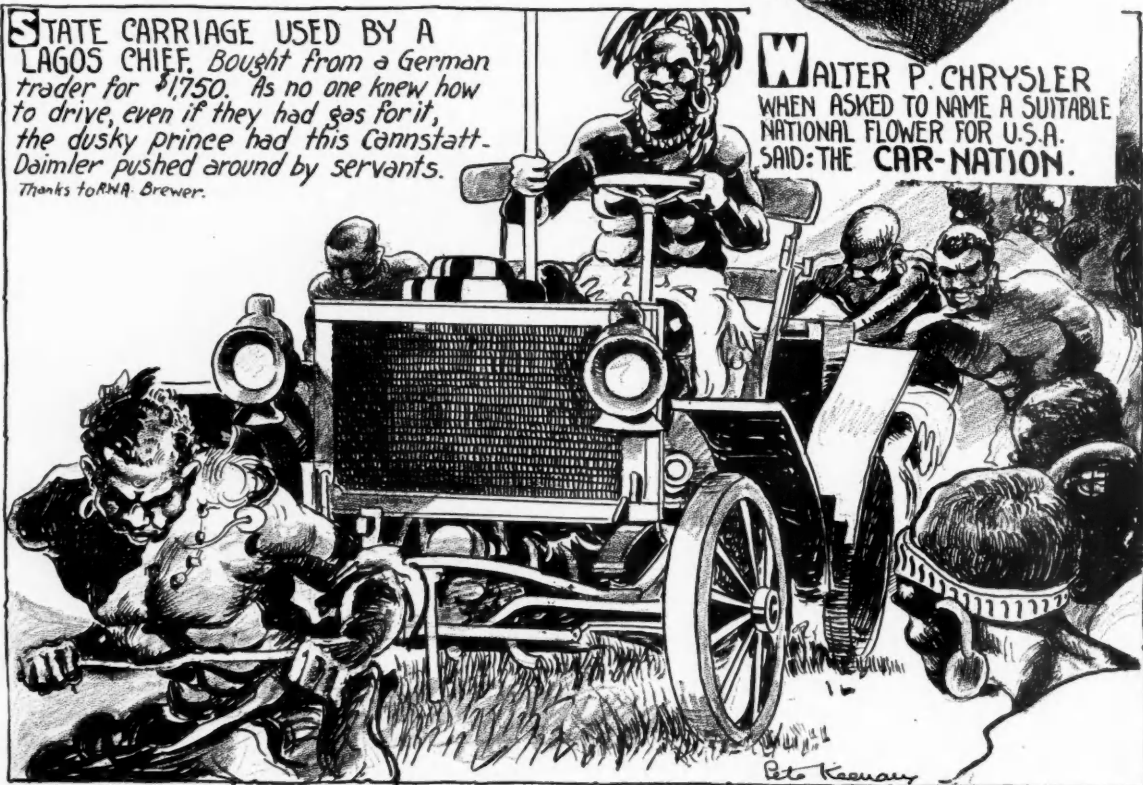


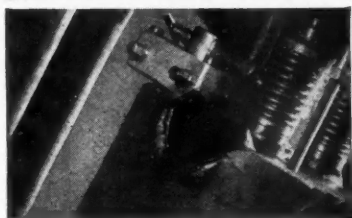
THE "EMPRESS OF
BRITAIN" HAS ABOARD A
COMPLETELY EQUIPPED GARAGE FOR
UNCRATED AUTOMOBILES.



STATE CARRIAGE USED BY A
LAGOS CHIEF. Bought from a German
trader for \$1,750. As no one knew how
to drive, even if they had gas for it,
the dusky prince had this Cannstatt-
Daimler pushed around by servants.
Thanks to RMA Brewer.

WALTER P. CHRYSLER
WHEN ASKED TO NAME A SUITABLE
NATIONAL FLOWER FOR U.S.A.
SAID: THE CAR-NATION.





NEWS

OF THE INDUSTRY



I. C. C. Maps Highway Plans

Resolutions Show Way to Development

WASHINGTON, May 11—National road committees and commercial organization members in countries desiring to develop their road systems were urged to take into consideration the following resolutions passed during the recent sessions of the International Chamber of Commerce:

I. ROAD ADMINISTRATION

- A. It is important to establish from the start a general plan of the road system, including existing roads and providing for their future development.
- B. A rational classification of roads is desirable, taking into account the origin, destination, nature and density of traffic.

Where a developed road system already exists a scientific traffic survey is the basis of this work.

- C. Tendency in favor of financial and administrative centralization would seem to correspond to a necessity, at least as far as the main road system is concerned.
- D. Autonomous governmental organizations for the administration and management of roads provided with separate budget are increasing in number, but their very principle is still discussed in certain countries.

(Turn to page 781)

Canadian Exports Up

WASHINGTON, May 14—In March, 1931, exports of Canadian motor vehicles were valued at \$799,198, an increase of 19 per cent as compared with shipments in February which totaled \$671,381, according to the Automotive Division.

THE Reading Railroad told the I.C.C. this week that buses operated by its subsidiary, Reading Transportation, were not taxed heavily enough . . . that's consistency, anyway *** Sir William Letts, managing director of Willys Overland-Crossley, attended his first American director's meeting this week, and following the ancient customs of Dirs Meetns, golfed later *** the Dep't. of Commerce finds that 50 cts. of the motorist's dollar expended for petroleum goes to crude oil production and refining . . . wholesaling the product takes another 23 cts. and bulk transportation charges 7 cts., gasoline taxes 10 cts., leaving 10 cts. for the opulent retailers *** the Bureau of Standards laboratory for testing aircraft engines at high altitudes is 14 yrs. old *** the Autocar Co., truck mfr., at Ardmore, gets from time to time subscription money intended for the Autocar, British motoring journal *** a Packard Diesel powered Bellanca plane has stayed in the air, without refueling, 74 hr., 12 min., short of the French record of 75 hr. 23 min. . . . another attempt will be made for the record at Jacksonville . . . Walter E. Lees and Frederic A. Brossy are pilots . . . wonder why the newspapers don't play up the no-refueling stunts? *** the last horse-drawn hearse, and the last horse-drawn vehicle used in commercial transportation in the Fiji Islands, were withdrawn from service during 1930, according to the Dep't. of Commerce *** Mrs. Charles F. Kettering has left for a trip through Europe *** the "largest band in the world" will parade around the track before the races at Indianapolis, May 30 *** Buick has made a vocational analysis of its sales and finds that farmers have bought 2 per cent more Buicks in a year . . . John Scoville started this vocational analysis business, we think, any other claimants? *** C. M. Dotterrer, supervisor of labor at Graham-Paige checked up and found that most of the ex. G-P employees on the dole list in Detroit had unsatisfactory working records *** The latest Duranty (Walter) dispatch from Russia tells about the trial of 42 officials of the Soviet Autostroy, a large automobile plant (we couldn't find any mention of it in the "Economic Handbook of the Soviet Union). The charge against officials was that they suppressed valuable proposals furnished by American workers and technical assistants . . . and incidentally by Russian workers. In other words, that suggestions for production economies made by those closest to the production lines were not heeded. Maybe there is a moral in that somewhere. On a plea from the worker-complainants, the indicted officials were let off lightly, a couple of them being "sentenced" to work for two months without pay in their current jobs. The presiding judge hoped this would be a lesson.

—H. H.

THE
NEWS
TRAILER

M. & E. A. Names Four Committees

Will Work Out Plan For Reorganization

NEW YORK, May 14—The Motor and Equipment Association has announced the formation of four committees to work out the plan for a federated association, which is described on the last page of the news section in this issue of *Automotive Industries*.

The committees have been constituted as follows:

Federation Committee: David Beecroft, Bendix Aviation Corp.; C. H. Burr, SKF Industries, Inc.; F. G. Wacker, Automotive Maintenance Machinery Co., and E. T. Satchell, Motor Accessories Co.

Manufacturers Committee: C. C. Secrist, Victor Gasket and Mfg. Co.; J. C. Ferguson, Eclipse Machine Co.; J. M. McComb, Crucible Steel Co.; Lothair Teetor, Perfect Circle Co.

Wholesalers Committee: E. R. Seager, Pennsylvania Rubber and Supply Co.; A. V. Hall, Sherwood-Hall Co.; and G. H. Niekamp, Beck and Corbitt Co.

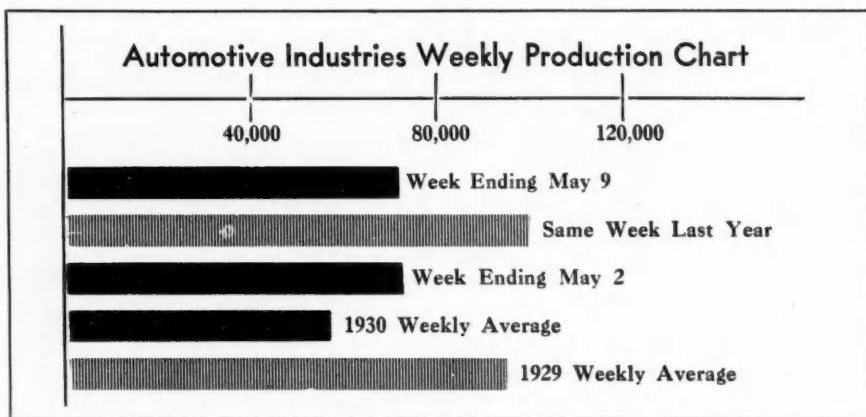
Federation Finance Committee: Messrs. Burr, McComb, Satchell, and F. S. Durham, Bonney Forge and Tool Works.

Jordan Gets Receiver

CLEVELAND, May 14—Appointment of John McArdle, vice-president and general manager of the Jordan Motor Car Co., Inc., and Adrian G. Newcomb, attorney, as receivers for the company, was confirmed. Appointment was made on petition of the Electric Auto-Lite Co., Toledo, with the consent of Jordan interests. Failure to obtain new financing for the company is understood to be the immediate cause for the receivership.

Timken Declares Dividend

Timken-Detroit Axle Co. declared its regular quarterly dividend of \$1.75 on preferred stock, payable June 1.



Philadelphia Section Meets

PHILADELPHIA, May 14—At the monthly meeting of the Philadelphia Section, Society of Automotive Engineers, held last night, a talk on the development and the characteristics of the Autogiro was given by Heraclio Alfaro, an engineer connected with Pitcairn Aircraft, Inc.

Among the advantages of the Autogiro he mentioned the following: It eliminates stalling and consequent loss of control which usually results in tail spin, thus adding greatly to the safety of flying; it increases the utility of aircraft in that it makes possible landing in small fields, such as are available on ordinary country places and very close to large centers of population; it makes riding in aircraft much smoother, because the wings of the rotor are not rigidly attached to the structure of the machine but are hinged to it and yield more or less so as to prevent sudden vertical accelerations.

This latter feature is expected to greatly widen the use of aircraft by the general public. In the discussion it was brought out that while hovering or making a nearly vertical descent, all of the weight is supported by the rotor, whereas in normal flight the latter carries only from 15 to 20 per cent of the weight. Mr. Alfaro said it was known to those connected with the development of the Autogiro that it was subject to further improvement and that the possibilities for future development were much greater in connection with the Autogiro than with the conventional type of airplane.

A.S.M.E. Meeting Closes

BALTIMORE, May 14—The fifth national technical meeting of the aeronautic division, American Society of Mechanical Engineers, closed here today, after more than 50 papers had been read in 15 technical sessions. Preprints of certain papers heard by the Society have been appearing in recent issues of *Automotive Industries*.

Durant Adds Model

LANSING, May 14—Announcement that a light six cylinder sedan, to be known as the 619 model, will be added to the present line of Durant cars

early in June, was made this week by Hal W. Alger, general manager of the Durant Motor Co. of Michigan. Deliveries to dealers will be started early next month.

The new model has a 71 hp. Continental motor of 199 cu. in. piston displacement. It has a top speed of between 75 and 80 miles per hour. The most radical change in the new car is in the slightly pointed V-type radiator and in the body, which is low and streamlined. Single bar bumpers in the front and rear constitute another feature.

Price of the new car is \$695 f.o.b. Lansing, Mich.

Petroleum Imports Drop

NEW YORK, May 13—Imports of petroleum for the week ended May 7, are placed at 196,714 barrels per day, as compared with 255,000 daily for the preceding week, and with 214,679 barrels for the four weeks ended May 9, according to the American Petroleum Institute.

Reports from companies aggregating 95.7 per cent of the daily potential refining capacity indicate that 2,326,400 barrels were run to stills daily during the week. Companies owning 94.9 per cent of potential charging capacity of all cracking units manufactured 3,189,000 barrels of gasoline during the week.

Rubber Stocks Decline

NEW YORK, May 12—Dealers' stocks of crude rubber in Malaya at the beginning of this week amounted to 42,467 tons, as compared with 45,607 tons at the close of March. Along with the reduced shipments reported during April, this reduced inventory is taken as indicative of a reduction in the production rate.

Free Wheels Another

INDIANAPOLIS, May 11—Free wheeling, with positive gear control, now is optional at slight additional cost on the new Marmon Big Eight, according to an announcement just made by George C. Tenney, general sales director of the Marmon Motor Car Co.

Advertising Less In Three Media

National Magazine, Radio, and Farm Publication Use Drops

NEW YORK, May 13—During the month of April the automotive industries spent \$1,632,131 for advertising in national magazines, according to "Trends and Indications," published by Dorrance, Sullivan & Co. The figures are based on material furnished by National Advertising Records. In the month of April, 1930, the sum of \$2,442,118 was spent for similar advertising.

For the four months of 1931, up to and including April, the amount expended for national magazine advertising was \$5,853,342, which compares with \$7,062,863 expended during the same period of 1930.

During the month of April of this year the automotive industries spent \$181,384 for advertising in farm magazines, which compares with \$238,700 spent during the month of April, 1930. The four-months total expenditure, including April, was \$603,113 for 1931, and \$719,960 for 1930.

For the month of March the industries spent \$117,063 on radio advertising over nationwide networks, which compares with an expenditure of \$156,711 for the same month last year. For the three months up to and including March the radio expenditures amounted to \$349,301 in 1931, and \$434,006 in 1930.

Foundry Changes Name

SAN FRANCISCO, May 13—Consolidated Foundries has changed its name to the General Metals Corp., and removed its offices to 485 California street, according to an announcement. The seven subsidiaries of the corporation have been classified into three vocational groups: foundry, forge, and machine.

Patent Appeal Denied

CINCINNATI, May 11—Petition for rehearing of the appeal of Motor Improvements, Inc., and Ernest J. Sweetland against General Motors Corp. and the AC Spark Plug Co., today was denied by the United States Circuit Court of Appeals, the higher court's decree, handed down April 17, affirming the district court for eastern Michigan, dismissing the bill of complaint.

Quintavalle Coming to U.S.

Bruno A. Quintavalle, managing director of the F. A. Magneti Marelli, Milan, and president of the Italian association of parts and accessory manufacturers, is expected to arrive in the United States May 27.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, May 13—There was little change in general business last week. The more seasonable temperatures stimulated retail trade somewhat. Wholesale and jobbing trade was at about the same level as in the several weeks preceding. No substantial improvement has been reported in general industry.

CHAIN STORE SALES

Sales of 37 store chains during April were about 2.1 per cent below those a year ago. Sales of these same store chains during the first four months of this year were 3.4 per cent below those a year ago.

DEPARTMENT STORE SALES

The Federal Reserve Board's index of department store sales during April, with allowance made for seasonal changes, stood at 105, as against 97 for March and 98 for February.

COMMERCIAL FAILURES

Commercial failures during April, according to R. G. Dun & Co., numbered 2386, as against 2604 during March and 2198 a year ago. The liabilities involved in the April failures, while somewhat below those during March, were 3.5 per cent above those a year ago.

CAR LOADINGS

Railway freight loadings during the week ended April 25 totaled 759,272 cars, which marks a decrease of 147,607 cars below those a year ago and a decrease of 292,613 cars below those two years ago.

CRUDE OIL OUTPUT

Average daily crude oil production for the week ended May 2 amounted to 2,475,100 bbl., as against 2,424,300 bbl. for the preceding week and 2,595,200 bbl. a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended May 9 stood at 72.0, as against 73.1 the week before and 74.0 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended May 6 were 18 per cent below those a year ago.

STOCK MARKET

The stock market was depressed during most of last week, but there were no violent fluctuations as in the preceding week. There was a brisk recovery on Friday, however; and several issues showed net gains for the week.

BROKERS' LOANS

Brokers' loans in New York City during the week ended May 6 decreased \$36,000,000, bringing the total down to \$1,699,000,000. There was a total contraction of \$150,000,000 in these loans during the three weeks ended May 6.

RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended May 6 showed a decrease of \$5,000,000 in holdings of discounted bills and an increase of \$24,000,000 in holdings of bills bought in the open market. Holdings of Government securities remained unchanged. The reserve ratio on May 6 was 83.4 per cent, as against 84.0 per cent a week earlier and 84.5 per cent two weeks earlier.

Dominion Move Approved

TORONTO, ONTARIO, May 11—Dominion Motors, Ltd., will receive the assets and liabilities, etc., of Durant Motors of Canada, Ltd., as a result of the unanimous approval of the Durant shareholders, in meeting here last week, to a motion to sell. It was

reported that 257,000 of the 287,000 shares outstanding were voted in favor of the proposal. Dominion Motors is a new company in which the Durant shareholders will receive share for share interest. It will have 287,000 shares, totaling \$2,870,000 in value. The new charter gives the company broad powers in the field of manufacture, permitting the building of motor cars both under the Durant name, and also for other manufacturers, besides airplanes, motor boats, electrical refrigerators, churns, farm equipment, etc.

French Pushing Plans

PHILADELPHIA, May 13—Some information regarding French plans for machines for the Schneider Trophy race for seaplanes, which is to be held on Sept. 12, next, has been published in the *Times* of London. The machines that are being built for the race are said to be Dewoitine, Bernard and Nieuport-Delage, low-wing, wire-braced monoplanes, with tractor propellers and twin floats. They are said to be designed for maximum speeds of 390-400 m.p.h. The Lorraine-Dietrich "Radium," and a new Renault engine are to be used.

The first of these is said to be designed to develop 2200 hp. at 4000 r.p.m., and to be supercharged by a blower running at 28,000 r.p.m., its weight being only 0.52 lb. per h.p. It is an inverted, water-cooled engine and is said to present a projected surface to the air no larger than that of the pilot's body. The new Renault engine is said to be a water-cooled, V-type of 2300 hp., weighing about 0.67 lb. per hp. The pilots for the contest machines are said to be training at Berre at present with older machines developing speeds of 250-300 m.p.h.

Peerless Reports Loss

CLEVELAND, May 13—Operations of the Peerless Motor Car Corp. for the quarter ended March 31 have resulted in a net loss of \$114,221, after depreciation and all other charges, making an accumulated net loss of \$201,525 for the first six months of the fiscal year. Sales in the more recent months have shown some improvement, but the increase has not been sufficient to place operations on a profitable basis, it was reported.

Separate Sales Forces

SPRINGFIELD, MASS., May 13—Announcement has been made jointly by the Van Norman Machine Tool Co., Springfield, and the Stanley Works, New Britain, Conn., that after June 1 the products of the two companies will be sold by their respective sales forces. During the past two and a half years the lines of the two companies have been marketed by the Van Norman Machine Tool Co.

G. M. Sales To Dealers Gain

Reach Highest Total Since Last August

NEW YORK, May 12—General Motors Corp. sold more cars to its dealers throughout the world in April than in any month since August, 1929. Total sales by corporation during the month of April, 154,252, as compared with 119,195 in March, and with 150,661 in April of 1930.

Sales by dealers in the United States during April were 135,663, as compared with 101,339 in March, and with 142,004 in April of last year. This represents an increase of 34 per cent in April over March of this year, as compared with a 15 per cent increase in April of last year.

April sales to consumers this year were higher than any month since April last year.

Sales to dealers in the United States during April amounted to 132,629, as compared with 98,943 in March, and with 132,365 in April of last year. Sales to United States dealers in April were the highest since May of last year.

The following table shows sales to consumers of General Motors cars in continental United States, sales by the manufacturing divisions of General Motors to their dealers in continental United States, and total sales to dealers, including Canadian sales and overseas shipments:

	United States Sales to Consumers		Sales to Dealers	
	1931	1930	1931	1930
Jan.	61,566	74,167	76,681	94,458
Feb.	68,976	88,742	80,373	110,904
Mar.	101,339	123,781	98,943	118,081
Apr.	135,663	142,004	132,629	132,365

Total Sales to Dealers, Including Canadian Sales and Overseas Shipments

	1931	1930
Jan.	89,349	106,509
Feb.	96,003	126,196
Mar.	119,195	135,930
Apr.	154,252	150,661

Noblitt Buys Hilab

CHICAGO, May 12—Noblitt-Sparks Industries, Inc., has acquired the business of Hilab Products Co., Indianapolis, Ind., manufacturer of rear-view mirrors for automobiles and trucks. Q. G. Noblitt, president of Noblitt-Sparks, announced yesterday. The company was acquired on a cash basis, he said.

Allis Backlog Declines

CHICAGO, May 9—Allis Chalmers Co. announces that its unfilled orders on May 1 totaled \$10,927,000. This compares with \$11,517,000 on April 1 and \$13,002,000 at the beginning of the year.

Kreusser Heads Detroit S. A. E. Section; Three Speakers Present Technical Topics

DETROIT, May 12—At the final meeting of the season of the Detroit Section, Society of Automotive Engineers, the election of O. T. Kreusser, research engineer, Fisher Body Corp., to the position of chairman of the Section for the coming year, was announced. Alex Taub, development engineer, Chevrolet Motor Co., was elected vice-chairman, Student Activities Division; E. S. McPherson, assistant chief engineer, Hupp Motor Car Corp., was elected vice-chairman in charge of the passenger car activity, and Roy F. Anderson, sales engineer, Murray Body Co., vice-chairman in charge of the body activity. William Pritchard, factory manager, Detroit Aircraft Corp., was named vice-chairman of the aeronautic activity. Ferd. W. Marschner, Western sales manager, New Departure Mfg. Co., is treasurer, and George Allen, director of engineering, Dodge Brothers, secretary of the Section.

Three speakers addressed the meeting, which was the most technical in nature held by the Detroit Section proper, this year. Fred Duesenberg, vice-president, Duesenberg, Inc., gave a summary of such information as is available at the present time regarding the entries for the Indianapolis race.

Dr. Miller Reese Hutchison, of the Hutchison Laboratory, described the operation and the functioning of the "Moto-Vita" combustion indicator being marketed by Moto Meter Gage and Equipment Corp. D. M. Pierson,

assistant chief electrical engineer, Chrysler Corp., discussed the elemental "Factors Affecting Efficiency of Combustion."

Fred Duesenberg in his summary said that it appeared from the specifications, although this was not necessarily true, that the entries at Indianapolis will include one Hudson eight, two Buicks, three Studebakers, two Reos, one Stutz and one Auburn. There are only six front-wheel drives, but three cars with independent springing. "In the 'professional' group there are five 16 and six 8-cylinder cars of approximately the same displacement. There is at least one two-cycle engine (of the Zoller type), entered by Leon Duray.

An interesting fact mentioned by Mr. Pierson was that in one year one motor club in Detroit received 35,000 calls for help from people having difficulty in starting their cars. Mr. Pierson expressed himself of the opinion that "missing" in an engine is due to the presence of non-combustible gas at the spark plug gap and that changes in spark timing, and plug position, resorted to to cure this trouble had the effect of exposing a different gas to the spark.

Mr. Hutchison stated that the next step in the merchandising of the Moto-Vita combustion indicator is the installation on buses and trucks for economical operation. The instrument determines the total B.t.u. present in the exhaust gas in the form of unburnt gases.

branch from its former location of 16 West 61st Street, New York, to the site of its former plant in Elizabeth, N. J. The company has rented considerable floor space from the purchasers of this plant and carries a complete display of its passenger and commercial vehicles.

Markets New Lining

PHILADELPHIA, May 12—Allbestos Corporation of this city has placed on the market a new-type flexible molded brake lining. It is supplied in continuous lengths of approximately 50 ft., in sizes from 1 to 12 in. in width and 1/8 to 5/16 in. in thickness.

In addition this lining is being cut to exact lengths to fit Ford Model A and Chevrolet Six, and packaged in sets of eight pieces, drilled and countersunk. All edges are ground to size.

Standard Elects Wilson

Robert E. Wilson, head of the development and patent department of the Standard Oil Co., of Indiana, has been elected a director of the company.

Hudson Offers Free Wheeling

Will Be Extra Option On All Cars Made by Company

DETROIT, May 17—Effective today the Hudson Motor Car Co., is offering "selective" free-wheeling on both the Essex and Hudson models at \$35 extra cost. The over-running clutch mechanism is incorporated in a separate housing bolting to the rear of the transmission. The clutch itself is of the roller type and similar in design to the Warner-Gear Co. free-wheeling unit used between second and third speeds in a number of other makes of cars.

In the Hudson-Essex design the location of the unit provides for free-wheeling in all three forward speeds. When shifting into reverse the free-wheeling unit is automatically locked out, and is brought back into the free-wheeling position by means of a separate control lever mounted just in back of the main gearshift lever. The latter has been curved up and then back to provide the necessary clearance for the additional control lever.

If desired of course, can be operated continuously or at the option in "conventional" engagement, by locking out the free-wheeling unit with the separate control lever.

150 Hudson-Essex distributors were at the factory this week, the largest gathering of distributors in the company's history, it is claimed, and drove back free-wheeling Hudson and Essex models.

Duplex Adds Products

NEW YORK, May 11—Duplex Motors, Inc., Everett, Mass., has developed a new motor for installation in motor vehicles.

This company has also perfected an auto radio loud speaker to place in the dome light of the closed passenger car body.

Among other recent developments the company has a heated windshield wiper plate and a hydraulic transmission.

Saginaw Begins Addition

DETROIT, May 13—Construction will start immediately on the addition to the Saginaw Malleable Iron Division plant of General Motors, making it the largest malleable iron foundry in the world. It is estimated that the capacity will be increased by about 50 per cent after the expansion.

Materials Testers to Meet

NEW YORK, May 11—The American Society for Testing Materials will hold its 34th annual meeting at the Hotel Stevens, Chicago, June 22 to 26.

New Reos Expected

DETROIT, May 13—It is expected that Reo will soon announce two new Flying Clouds, an eight and a six at the lowest price at which the Reo Flying Cloud has ever been offered. While specific details are lacking, it is said the new models will feature sharp V-shaped radiators, and one-piece fenders patterned after those developed in the aerodynamic laboratory for the Reo Royale.

Illinois Sales Continue Up

CHICAGO, May 14—Outstanding improvement in April new car sales in Illinois is noted in the monthly report issued by the Illinois Chamber of Commerce, showing 17,004 new cars registered in the state in April, compared to 11,583 in March. It was the fourth successive month in 1931 that a substantial increase was shown. Cook County accounted for 9141 cars with downstate counties showing 7863 sales.

Durant Moves Branch

NEW YORK, May 12—Durant Motors, Inc., has moved its Eastern

I.C. of C. Maps Highway Plans

Resolutions Point Way to Best Use of International Funds

(Continued from page 777)

II. ROAD CONSTRUCTION

- A. Before constructing or improving a road, it is necessary to make sure that its location and type are such as will attract sufficient traffic to justify the work. The first step is to get some sort of usable highway communication, thus making available at the earliest possible time a large mileage of roads, even though it be of a primitive character, in those countries which are at the outset of the work. This done, the road can then be improved to the economic degree necessary to meet traffic requirements.
- B. It is important to determine for several years in advance the program of the work to be undertaken.
- C. The total of road maintenance and vehicle operation costs is reduced when a worn and ancient road is replaced by a modern surface of a type justified by the character and volume of traffic.

III. ROAD BUDGET

- A. The crux of the problem is to apportion the cost of roads fairly between the three principal interests concerned—the general public, real estate owners and road users. Roads are public property and it is logical that their cost should be met in part out of general revenue in proportion to the general public benefits. Real estate owners in localities opened up by the roads should also participate to a certain extent in road expenditures, because of the special advantages they derive therefrom. Contributions from users are justified for the same reason, and with increasing use should assume a progressively larger share.
- B. Special taxes on highway users should be limited to such amounts as will not tend to deprive the public of the benefits of normal development of motor transportation. Such special taxes should be used exclusively for road purposes.
- C. Bond issues based on reasonable general or real-estate taxes makes it possible to gain several years in the construction of the road system of a new country. However, experience would seem to show that the bond method becomes more generally desirable.

Financial Notes

J. I. Case Co. directors will meet in Racine, Wis., May 21 to take action on the preferred and common quarterly dividends of \$1.75 and \$1.50 respectively, payable July 1, Theodore Johnson, secretary of the company announces.

Hayes Body Corp. reports for quarter ended March 31, 1931, net loss of \$93,335, after depreciation, interest, etc., compared with net loss of \$106,695 in corresponding period last year.

Eaton Axle & Spring Co. has received listing on the New York Stock Exchange for 100,000 shares additional common stock with no par value. This stock will be used in exchange for all the assets of the Reliance Manufacturing Co., according to a plan which was proposed March 24 of this year.

Motor Wheel Corp. and subsidiaries report net profit for the first quarter of the current year of \$44,792. This is equivalent, after all charges, of 5 cents a share on common stock, in comparison with \$594,435, or 72 cents a share for the first quarter of 1930. The company has declared a quarterly dividend of 25 cents on common stock, payable June 10 to stock of record May 20, thus placing the stock on a \$1 annual basis, as compared with the former \$3 basis.

Muskegon Motor Specialties Co. has declared a regular quarterly dividend of 50 cents a share, payable June 1, on stock of record May 20.

United Aircraft and Transport Corp. reports net income for the first quarter of the year of \$806,646 after all charges. This is equivalent to 30 cents a share on common stock.

Waco Aircraft Co. reports net loss for the first quarter of the current year of \$30,112.

Briggs Mfg. Co. reports net profit for the first quarter of the current year, after all charges, of \$43,731, or two cents a share. This compares with earnings of \$760,737 or 38 cents a share for the corresponding year.

Meteor Motor Car Co. has declared quarterly dividend of 25 cents, payable June 1st to stockholders on record May 20.

Mack Trucks, Inc., reports net loss for the first quarter of the current year of \$178,737. This compares with profit for the first quarter of last year of \$490,709, or 64 cents a share on the common stock.

Hudson Motor Car Co. stockholders will meet at the Detroit offices of the company on May 11. Holders of record May 5 will be entitled to participate in this annual meeting.

Firestone Tire & Rubber Co. has declared its regular quarterly dividend on 6 per cent cumulative preferred stock, series A. It was \$1.50 per share, payable June 1 to stockholders of record May 15.

Briggs Mfg. Co. has been refunded \$203,020.65 in federal taxes for an over-assessment in 1928.

Rubber Use Increases

NEW YORK, May 13—Consumption of crude rubber by manufacturers in the United States for the month of April was the highest for any month since June, 1930, and is estimated to be 33,321 long tons, an increase of 1.6 per cent over the March consumption of 32,788 long tons, according to statistics compiled by the Rubber Manufacturers Association.

Imports of crude rubber for April amounted to 46,648 long tons as compared with 40,338 long tons for March and 49,927 long tons for April, 1930.

The Association estimates total domestic stocks of crude rubber on hand and in transit overland on April 30 at 228,382 long tons, an increase of 4.9 per cent over March, and 54 per cent over April, 1930.

Crude rubber afloat for United States ports on April 30th is estimated at 56,700 long tons as against 63,133 long tons on March 31st and 63,261 long tons on April 30th a year ago.

New Speed Records Set

British Drivers Sweep Class C and Class E Marks

PHILADELPHIA, May 14—New international class speed records in Class C (for cars of 3000 to 5000 cu. cm. displacement) and Class E (for cars of 1500 to 2000 cu. cm. displacement) have been confirmed by the International Association of Recognized Automobile Clubs, Paris, according to an announcement from the Association received today. All the new records were made at the Montlhery track in France.

The first group of records, for Class C, was made by a Bentley team including Norton, Froy, Raphael, and Mrs. Stewart. Records were made from a standing start for distances of 1000 miles, 2000 kilometers, 2000 miles and 3000 kilometers. Time records were made for a 12 hr. and a 24 hr. run. The best average speed was made in the 2000 kilometer try, and reached 98.03 m.p.h.

The second group of new records in Class E was established by Mrs. G. M. Stewart, driving a Derby-Miller. Mrs. Stewart's best time was made in a five-kilometer try on April 7, when she hung up an average speed of 139.81 m.p.h. Other marks were set in the five-mile, ten-kilometer, and 10-mile tries.

The Class C records were established on April 22-23 and the Class E records on April 3-7.

Seventeen States Report

PHILADELPHIA, May 14—A gain of 25 per cent in April registrations of new cars over March, but a loss of 29 per cent from April, 1930, is indicated by reports from the 17 states and the District of Columbia for which final figures are now available. In this group of states, Chevrolet was 4 per cent ahead of Ford and only 8 per cent behind April last year. Ford showed a loss of 48 per cent. All other makes combined, were off 22 per cent. These early returns tend to indicate that the April increase was slightly less than the normal seasonal.

Linn Adds Tractor

MORRIS, N. Y., May 14—A new tractor model, 4-28-D, powered with a low-speed, heavy-duty, four-cylinder Waukesha engine, has been announced by the Linn Mfg. Corp.

DiVco Sets Record

DETROIT, May 14—The DiVco-Detroit Corp. set a new sales record in April, exceeding its previous high sales month, April, 1929, by 17 per cent.

Men of the Industry and What They Are Doing

G.M. Names Garrett

Alfred P. Sloan, Jr., has announced the appointment of Paul Willard Garrett to the position of director of public relations of the General Motors Corp., with headquarters in New York City. Mr. Garrett for the past six years has been the financial editor of the *New York Evening Post*.

N.A.T. Elects Johnson

P. G. Johnson, president of Boeing Manufacturing and Operating Companies, has been elected president of National Air Transport. Paul Henderson, former president, becomes chairman of the board. Lester D. Seymour continues as vice-president and treasurer.

Hughes is Promoted

The promotion of Percy M. Hughes, Jr., to the newly created post of materials manager of the H. H. Franklin Manufacturing Co., has been announced by Frederick J. Haynes, vice-president and general manager. His record at the Franklin factory dates to 1919, when he began as a worker in the engine assembly division following war-time service in France as a lieutenant.

Budd Names Germane

Budd Wheel Co. has appointed Frank M. Germane as special sales representative with headquarters in Detroit. Mr. Germane has been connected with the automobile industry since 1901, having been at one time special representative for the Timken Roller Bearing Co., and having served for the past five years as president of the Bearings Co. of America of Lancaster, Pa.

Coffman to Handle Space

The committee in charge of the joint show of the National Standard Parts Association and the Motor and Equipment Association, to be held in Atlantic City, Dec. 7 to 12 inclusive, has appointed A. B. Coffman as manager to handle all space reservations.

Mr. Coffman will handle show matters in Chicago until approximately one month prior to the opening of the show, at which time he will establish a staff in Atlantic City. Mr. Coffman has handled the shows for the M.E.A. for several years.

De Soto Names Three

The appointments of R. M. Rowland as assistant sales manager; John J. Palmer as assistant to the president, and Ray C. Blackwell as director of

advertising of De Soto Motor Corp., have been announced by Byron C. Foy, president.

Mr. Rowland has been with the Chrysler Corp. for several years as sales promotion manager and more recently director of advertising of Chrysler Sales Corp.

Mr. Palmer, who has been assistant general sales manager of De Soto Motor Corp., will be located at the Detroit office in his new position.

Mr. Blackwell goes to De Soto from MacManus, Inc., with which firm he was an account executive for some time.

Bantam Names Frauenthal

A. H. Frauenthal, for many years chief inspector and metallurgical engineer of the Chandler Motor Car Co. and quality engineer of the Studebaker Corp., has returned from a two-year rest in California and will represent the Bantam Ball Bearing Co. of South Bend, Ind., as resident engineer in the Cleveland, Ohio, district.

Stutz Elects Headington

E. W. Headington, president of the Stutz New York Co., Inc., has been elected a director of the Stutz Motor Car Co. of America, Inc. In his capacity as director, Mr. Headington will represent the Stutz dealer organization.

Diederich Joins Chevrolet

J. W. Diederich has joined the engineering organization of Chevrolet Motor Co. in the commercial car development division. Recently Mr. Diederich has been associated with Reo Motor Car Co. conducting special investigations in the truck field.

David Visel Resigns

David Visel has resigned as vice-president in charge of sales of the Curtiss-Wright Flying Service. Sales activities will now come under the direct supervision of Major E. H. Brainerd, president of the company.

Thompson Succeeds Hilands

J. P. Hilands, who has been Eastern sales manager of the Ohio Seamless Tube Co. for many years, has severed his connection with the company and has been succeeded by W. S. Thompson.

G.M.A.C. Elects Myers

At a meeting May 11 of the board of directors of the General Motors Acceptance Corp. Joseph L. Myers, vice-president, was made a director.

Motor Industry Biggest in U. S.

New Edition of N.A.C.C.'s "Facts and Figures" Cites More Proof

NEW YORK, May 12—The motor industry ranks first of all the industries of the country, according to the 1931 *Facts and Figures* just published by the National Automobile Chamber of Commerce.

This new edition contains a number of features not found in former editions, and has been rearranged so that all tables pertaining to specific phases of the industry will be found together.

The value of motor vehicles in the 1929 census of manufacturers, according to the table of ranks of industries, is \$3,717,996,553. The next industry was the slaughtering and meat-packing industry, with the value of \$3,394,672,995, and the third is steel and rolling mills, with a value of \$3,356,894,259.

Among other interesting new facts shown in this year's volume are that there are more automobiles in use in the United States than there are telephones; figures and charts showing the use of motor transport by railroad lines; a chart showing the impact on road surfaces given by the various types of vehicles with different kinds of tires; a map of the projected Inter-American highway, adjoining the southern border of the United States with the Panama Canal; more detailed information as to the use of raw materials in the automotive industry; a tabulation of the number of motor vehicles owned by various departments of the United States Government; and an analysis of the retail sales of automotive products, as compared with other products in 644 cities.

Much more space is devoted in this issue to an analysis of taxes on automobiles and gasoline and the contribution made by the automotive industry to the support of highways.

The analysis of the gasoline taxes shows there has been a steady increase in revenues received from this source.

E. C. Bullard Honored

A testimonial dinner was given in Bridgeport, Conn., May 7, in honor of Edward C. Bullard to mark the occasion of his appointment as general manager of the Bullard Co. to succeed his uncle, the late Stanley Hale Bullard.

Marvin on Vacation

James S. Marvin, assistant general manager of the National Automobile Chamber of Commerce, has sailed aboard the S.S. Adriatic for a brief vacation in Europe. Mr. Marvin will spend much of his time in England, but will also visit the continent.

Miles Returns to U. S.

S. A. Miles, national show manager of the National Automobile Chamber of Commerce, who has spent the winter in England, returned to this country last week.

Seasonal Slump Is Less in Steel

Automotive Specifications
Continue to Bolster
Uncertain Market

NEW YORK, May 14—Clearly indicating that automotive demand for steel is well maintained, comes news that one of the Mahoning Valley rolling mills, following six weeks' idleness, is preparing for a resumption of operations within the next few days. While seasonal deflation of activity must be looked for over the next few months, it is confidently expected to be less sharp than in other years. That this expectation is justified was shown by the unfilled tonnage statement of the leading interest, which was made public after the close of Saturday's stock market, and which revealed a decrease of 97,601 tons, as compared with the end of the preceding month.

The average decrease in the corporation's unfilled tonnage at the end of April during the past decade was approximately three times what it was this year. Operating at one-half of its total capacity, the corporation has on its books orders to carry it through the next five months, and this, it is understood, does not include some business booked for postponed delivery, and which for that reason was not included in the backlog. In typically automotive descriptions of steel, such as full-finished automobile sheets and cold-rolled strip steel, conditions, when compared with the general run of steel products, are certainly encouraging, at least in so far as volume is concerned.

Cold-rolled strip mills are operating at approximately one-third of capacity, which represents an improvement of approximately 20 per cent over the low point of the year. Tonnage bookings for both sheets and strip, however, reflect keenly the intensive aggressiveness of Detroit district producers when it comes to the demand at their front door.

Pig Iron—Moderate buying by automotive foundries, mostly in single carloads, continues. Prices remain unchanged, but the market at some points is easier. An increase in production was noted last month.

Aluminum—Demand is running very much the same as last month. Heavy accumulations of secondary No. 12 alloy have caused this grade to decline to 9 cents.

Copper—The market is strictly nominal, with producers quoting 9½ cents, delivered Connecticut Valley, and 9¾ cents, delivered Middle West. Abnormally low prices are causing more and more curtailment of production. Entry of Rhodesian mines, in which South African properties of American capital is interested, upon quantity production, is causing additional trouble to the sorely beset market.

Tin—The tin market is marking time, with spot Straits quoted at 23.20 cents at the week's opening.

Lead—The leading interest announced another \$2-a-ton reduction on Monday, when the contract price became 3¾ cents, New York. Consumers are waiting for more steady conditions.

Boyd Denies Senator Borah's Charges That Petroleum Prices are "Fixed"

By W. R. BOYD, JR.
Executive Vice-President
American Petroleum Institute

NEW YORK, May 11—The charge is frequently made, but never substantiated by facts, that prices for petroleum products are fixed arbitrarily. Roundly one dozen investigations of such charges have been conducted by federal agencies over the past 12 years without developing any proof. The Federal Trade Commission, in the period 1916 to 1927, conducted and reported nine investigations, four in response to Senate resolutions, two by direction of the House of Representatives, two on the Commission's own initiative, and one at the request of the President.

Senator William E. Borah is quoted as saying in a recently issued public statement:

"In February, 1926, the price of Mid Continent oil averaged \$2.04. In February, 1929, the price was \$1.20 per barrel. But the price of gasoline averaged about 18.09 cents per gallon in February, 1926, and 18.39 cents in February, 1929, notwithstanding the fact that in 1929 the refineries were recovering 44 per cent gasoline from the average barrel of crude oil, as compared with 36 per cent in 1926. The fall of the price of crude oil had no effect upon gasoline except to raise the price of it."

The American Petroleum Institute has tabulated the gasoline prices in 50 representative cities on the first of each month for the period January 1, 1919, to April 1, 1931. The tabulation covers tank-wagon quotations; service-station prices, exclusive of the gasoline tax; state gasoline tax averages, and service-station prices, including the state tax and service-station charge. The rise and fall of the posted price of 36-deg. gravity Mid Continent crude oil also has been tabulated.

From Feb. 1, 1926, when crude oil was quoted at \$2.04 per barrel, to Feb. 1, 1929, when the quoted price was \$1.20 per barrel, the decline amounted to 84 cents per barrel, or at the rate of 2 cents for each gallon in the 42-gal. barrel. During this same period the average service-station price of gasoline decreased 1.58 cents per gallon.

From Feb. 1, 1926, when the price of crude oil was \$2.04 per barrel, to Jan. 1, 1931, when the price was 95 cents per barrel, there was a decline per barrel of \$1.09, or 2.59 cents per gallon of crude oil. During this same period the average service-station price of gasoline decreased 4.48 cents per gallon.

From Feb. 1, 1926, when the crude oil price was \$2.04 per barrel, to April 1, 1931, when the price was 59 cents per barrel, there was a decline of

\$1.45 per barrel, or 3.45 cents per gallon. During this same period the average price paid for gasoline at service stations decreased 5.67 cents per gallon.

The average gasoline tax rate is at present almost 30 per cent of the average retail service-station price of gasoline in the 50 representative cities. This represents an average tax of 3.98 cents per gallon. Perhaps Senator Borah, in computing the gasoline prices he quoted, made the natural and plausible error of including state taxes, which, rising from a fraction of a cent back in 1919 nearly to 4 cents per gallon in 1931, have tended to offset the marked decline in the retail price of gasoline. While the oil industry is placed in the unenviable position of gasoline tax collector, it cannot be held responsible for a levy that increased by 2 to 6 cents per gallon the price the public pays for an otherwise extraordinarily cheap commodity.

The average service-station price and the average gasoline tax rate per gallon are given in the following table, which shows also the decline in the price paid the oil industry for gasoline:

April 1	Av. Service Station Price	Av. State Tax per Gal.	Total Paid by Consumer
1919	0.2538	0.0006	0.2544
1920	0.2931	0.0008	0.2939
1921	0.2755	0.0016	0.2771
1922	0.2398	0.0038	0.2436
1923	0.2409	0.0079	0.2488
1924	0.2155	0.0141	0.2296
1925	0.2140	0.0203	0.2343
1926	0.2031	0.0242	0.2273
1927	0.1893	0.0266	0.2159
1928	0.1750	0.0304	0.2054
1929	0.1744	0.0336	0.2080
1930	0.1574	0.0380	0.1954
1931	0.1329	0.0398	0.1727

A correct analysis of the price figures shows conclusively that the gasoline price has responded to the law of supply and demand, and that the trend of prices, not including the state gasoline taxes, relatively has followed downward the crude-oil price.

Gemmer Suit Settled

DETROIT, May 13—Withdrawal of a suit filed in Federal Court against the General Motors Corp. has followed an amicable adjustment of steering-gear patent rights on which infringement was claimed by Marles Steering Gear Co. of America, affiliated with the Gemmer Manufacturing Co., it has been announced by E. P. Hammond, president of Gemmer.

Under the settlement General Motors will acquire rights to use the Marles type of steering, under a continuing royalty arrangement, with a monetary consideration for previous use.

Foundrymen Elect Ballard

Decide Tentatively
On Chicago as Place
for Next Meeting

CHICAGO, May 11—Election of officers and virtual decision to hold the 1933 convention in Chicago during the World's Fair marked the closing session of the thirty-fifth annual convention of the American Foundrymen's Association in the Stevens Hotel last week. The decision to meet in Chicago in two years must be acted upon later by the board of directors.

E. H. Ballard, general foundry and pattern shop superintendent of General Electric, was elected president of the association; Col. T. S. Hammond, president of the Whiting Corp., Harvey, Ill., was elected vice-president; and C. E. Hoyt, Chicago, was named executive secretary. New directors were elected as follows: Dan. M. Avey, editor, *The Foundry*, Cleveland; W. D. Moore, president, American Cast Iron Pipe Co., Birmingham, Ala.; Fred L. Wolf, technical superintendent, Ohio Brass Co., Mansfield, Ohio; N. K. B. Patch, secretary, Lumen Bearing Company, and past president of the association. Mr. Patch was also made an honorary member of the association.

Centrifugal casting of guns was discussed by Col. T. C. Dickson, of the Watertown, Mass., Arsenal, Thursday afternoon. The convention, which had an attendance of 3500, closed Thursday night with an alumni dinner and meeting of the board of directors.

Color Black Keeps Lead

NEW YORK, May 11—At the end of the month of April the color black seemed firmly established as the most popular color for automobile finishing, according to the *Automobile Color Index* of the Duco Color Advisory service. A year ago, in the same month, the color blue occupied the leading position. It is now in second place, according to the Index.

The six leading color families, with their positions at the end of April, are as follows: first, black, with an index number of 196; second, blue, 114; third, green, 83; fourth, brown, 81; fifth, maroon, 53; sixth, grey, 43.

In April of 1930, the colors ranked as follows: first, blue, 174; second, black, 143; third, green, 101; fourth, brown, 92; fifth, maroon, 56; and sixth, grey, 27.

N.S.P.A. Elects

DETROIT, May 11—From the largest number of applications submitted to an N.S.P.A. Membership committee in two years, 27 new members were elected by the National Standard Parts Association on April 29. Included were 22 jobbers and five manufacturers whose names follow: Plomb Tool Co., Los Angeles, Calif.; Price Battery Corp., Philadelphia, Pa.; South Bend Lathe Works, South Bend, Ind.; Tung-Sol Lamp Works, Inc., Newark, N. J.; The Wayne Co., Fort Wayne, Ind.

Entries for Indianapolis 500-Mile Race Set Post-War Record in Number Applying

INDIANAPOLIS, May 11—Seventy-one cars have been entered in the 500-mile race at the Indianapolis Motor Speedway, May 30, it was announced last week by speedway officials.

The official entry list closed at midnight May 1. It is possible that even more entries, mailed from distant points before that time, will be received. It is the largest group of cars ever entered in this historic racing classic. Fifty-three was the previous high mark, and this was before the war.

Four previous winners of 500-mile

races are on the lists. They include Ralph De Palma, who won in 1915; Peter De Paolo, De Palma's nephew, who was victorious in 1925; Louis Meyer, who came home first in 1928, and Billy Arnold, last year's winner. De Paolo holds the track record of 101.13 m.p.h. for the distance.

Only 40 cars are permitted to start the race. This means every car entered will have to undergo a qualifying trial, racing against time for 10 miles. The 40 fastest cars will face the starter. Trials begin May 23, and continue until the day before the race.

Entrants for the Indianapolis Classic

ENTRANT

Wm. S. White
Empire State Gas Motors, Inc.
Empire State Gas Motors, Inc.
B. L. Schneider
B. L. Schneider
Alvin K. Jones
Milton Jones
Milton Jones
Harry Hartz
Harry Hartz
Ralph Hepburn
Cliff Durant
Cliff Durant
Buddy Marr
Cummins Engine Co.
Roy Brady & Gabriel Nardi
Phil Shafer
Frank Brisko
Alden Sampson II
Stutz Motor Car Co. of Amer.

W. S. White
D. A. Jenkins
Coleman Motors Corporation
Milt Marion
Elco Grease & Oil Co.
George N. Howie
Louis Meyer
Wm. Alberti
George A. Henry
Bessie Decker
M. J. Boyle
Anna De Blase
C. E. Picketts
Grapho Metal Packing Co.
Harry H. Butcher
Chas. Moran, Jr.
James H. Booth
R. W. Painter
M. A. Yagle
Fronty Sales Co.
Andrew Finneran
Benny Brandfon
F. E. Clemons
F. E. Clemons
John Cacase
Rigling & Henning
Russell Snowberger
Dick Woods
Dick Woods
Dick Woods
Dick Woods
Leon Duray
Wm. Richards
George Wingerter
Wm. Yahr
Burbach & Classon
Midway Motor Service
Charles Burgert
A. S. Duesenberg
James H. Wade
James H. Wade
James H. Wade
Denny Duesenberg
Phil Pardee
W. Van B. Claussen
Paul C. Searles, Jr.
O. C. Reeder
Henry Maley
S. C. Goldberg
S. C. Goldberg
Walt May

CAR

Harry Miller Special
Empire State Special
Empire State Special
Bowes Seal Fast Special
Bowes Seal Fast Special
Jones-Maley Special
Jones Miller Special
Jones Miller Special
Miller-Hartz Special
Duesenberg
Unnamed
Unnamed
Unnamed
Cummins Diesel
B & N Special
Unnamed
Unnamed
Sampson Special
Stutz Bear Cat
Unnamed
Hunt Special
Coleman Special
Duesenberg Special
Elco Royale Special
G N H Special
Jadson Special
Alberti Special
Unnamed
Miller Special
Boyle Valve Special
De Blase Special
Unnamed
Morton & Brett Special
Butcher Brothers Special
Model A Ford Special
Buckeye Special
Unnamed
Pedrick Piston Ring Special
Fronty Special
Finneran Special
Duesenberg Special
Unnamed
Unnamed
Miller Special
Unnamed
Russell 8 Special
Duesenberg Special
Duesenberg Special
Mercedes
Woods Special
Duesenberg Special
Richards Special
Wingerter Special
Unnamed
Unnamed
Unnamed
Duesenberg Special
Unnamed
Unnamed
Unnamed
Duesenberg Special
Duesenberg Special
Miller Wehr Special
Miller S. L. Special
Unnamed
Unnamed
Unnamed
Schofield-Curlett Dual Spl.

DRIVER

Wm. "Shorty" Cantlon
Wm. C. Cummings
Unnamed
Louis Schneider
Anthony Gulotta
Joe Caccia
Unnamed
Milton Jones
Billy Arnold
Unnamed
Ralph Hepburn
Leon Duray
Unnamed
Chet Miller
David Evans
Wm. Denver
Phil "Red" Shafer
Frank Brisko
Louis Meyer
L. L. Corum
Bert Karnatz
D. A. "Ab" Jenkins
Lou Moore
Milt Marion
Unnamed
George N. Howie
Myron Stevens
Al Aspen
Joe Russo
Rick Decker
Peter De Paolo
F. W. Sparks
W. H. "Speed" Gardner
Unnamed
Harry H. Butcher
Chas. Moran, Jr.
E. Triplett
Unnamed
Frankie Farmer
Eugene Hausteine
Joe Thomas
Benny Brandfon
Unnamed
James O. Patterson
Unnamed
Russell Snowberger
Unnamed
Unnamed
Unnamed
Luther Johnson
George Wingerter
Sam B. Ross
Eddie Burbach
Walter J. Zale
Malcomb H. Fox
Unnamed
Unnamed
Unnamed
Unnamed
Phil Pardee
Ralph De Palma
Unnamed
M. M. Trexler
A. B. "Deacon" Litz
Unnamed
Unnamed
Walt May

Indian Adds Model

NEW YORK, May 11—Indian Motorcycle, Springfield, has developed a three-wheel motorcycle called the Dispatch-Tow for use in the service trade.

The vehicle has rear-wheel differential, brakes on all three wheels, and a case between the two rear wheels in which the garage man can carry service tools, spare parts and an extra battery.

Exports Rise 15.8 Per Cent

March Figures Show Improvement; Belgium Becomes Chief Market

WASHINGTON, May 11—Exports of all automotive products during the month of March had a total valuation of \$19,916,929, a gain of \$2,715,018 or 15.8 per cent over the preceding month, according to the Automotive Division, Department of Commerce. This figure is the highest export total recorded for the automotive group since June, 1930. Shipments for the corresponding month in 1930, 1929 and 1928 were valued at \$39,964,968, \$78,324,879 and \$49,954,163, respectively.

Production during March was 25.7 per cent higher than in February while exports of passenger cars and trucks increased by 31.2 per cent. This gain was participated in by all classes with the exception of the passenger car group "over \$2,000," and the heavy trucks "over 2½ tons" capacity. Especially noticeable are the higher totals for low price passenger cars as well as trucks "under 1 ton" capacity, the former gaining 2071 units or 29 per cent over the February total, and the latter 1083 units or 130 per cent.

Twelve of the leading markets for passenger cars and six of the most important purchasers of trucks were considerably stronger in their demands during the month under review. Belgium, with increases over February of 62 per cent in passenger cars and 146 per cent in trucks, occupied the position of leading market, closely followed by Sweden, Canada and Denmark in the first instance and Denmark, Sweden and Japan in the truck group.

All of the leading truck markets, except Sweden and Argentina, were stronger than during the corresponding month of 1930. The average unit export value of passenger cars was \$587 and of trucks \$520, as compared with \$638 and \$591 in February and \$706 and \$693 in March of last year.

James N. Heald

WORCESTER, MASS., May 11—James N. Heald, president and general manager of the Heald Machine Co., died May 6, according to an announcement from the company. Mr. Heald had been in poor health for several years, according to the announcement.

Mr. Heald represented the third generation of a family which entered the metal-working business at Barre, Vt., in 1826. In 1888 he personally took over the management of the company, and in 1903 organized the Heald Machine Co.

Materials Group to Meet

PHILADELPHIA, May 12—The first international congress of the New International Association for the Testing of Materials will be held at Zurich, Switzerland, Sept. 6-12, in the buildings of the Federal Polytechnic School. The program has been divided into four groups, of which Group A relates to metals. Under this head will be discussed Cast Iron, Strength of Metals at High Temperatures, Fatigue,

Notched-Bar Impact Tests, and Progress of Metallography.

Automotive engineers may also be interested in Group C, Organic Materials, which includes Fuels, and in Group D, Questions of General Importance, which include the following subjects: Fundamental and Test Relations Between Elasticity and Plasticity; Toughness and Brittleness; Determination of Grain Size in Loose Materials, and Calibration and Accuracy of Testing Machines.

Trade Program Set

NEW YORK, May 11—Among the topics for discussion at the Eighteenth National Foreign Trade Convention to be held in New York, May 27 to 29, will be the question of tariff as it affects foreign trade, which will be headed by C. T. Riotte, president of the Chelsea Sales Corp.

Dr. Julius Klein, Assistant Secretary of Commerce, will be among the speakers, and he will discuss, "Are We Losing Out in Foreign Trade?"

The final lunch of the convention on May 29 will be held under the auspices of the Overseas Automotive Club and will be presided over by P. T. Baillet. Among the speakers at the lunch will be J. D. Helthall, manager, export lacquer sales, Sherwin-Williams Co., and R. C. Thompson, export manager, Prest-O-Lite Storage Battery Sales Corp.

Budd Wheel Shipments Up

PHILADELPHIA, May 12—Shipments of wheels in April exceeded those of any month in the history of the Budd Wheel Co., totaling 357,701 wheels and exceeding by more than 60,000 wheels the best previous month, April, 1929, when 292,876 wheels were shipped, according to an announcement made here today. Officials of the company also announced that shipments for the first four months of this year totaled 1,082,438, as against a total of 1,961,945 for the whole of 1930.

William A. Long

HARTFORD, CONN., May 12—William A. Long, associated with the Pratt & Whitney Co. since 1925, died May 3, according to an announcement made here today. Mr. Long was 60 years old, and for 36 years had been connected in some way with the cutting and finishing of gears. Some of his former connections included the Pierce-Arrow Motor Car Co. and the H. H. Frankling Mfg. Co.

Cadillac Sells 1984 V-12's

DETROIT, May 11—There were 1984 Cadillac V-12's delivered at retail during the first six months this car was on the market, according to factory sales records. The V-12 was announced in October, 1930. Figures include sales through March, 1931.

Aircraft Sales Ahead of Output

First Quarter Operation of Industry Favorable

NEW YORK, May 12—The aeronautical industry sold \$9,018,914 worth of military and commercial aircraft and engines during the first quarter of the current year, according to statistics compiled by the Aeronautical Chamber of Commerce of America, Inc. This represents an increase over the corresponding period of 1930 of \$39,252.

Production, however, was off 10.4 per cent during the quarter, the value of the new production being \$7,923,233, as compared with \$8,814,405 last year.

An analysis of these sales shows an increasing interest in open-cockpit one and two-place monoplanes. Commercial production and sales in units for the first quarter were off considerably from a year ago, production being down 60 per cent and deliveries 63 per cent, but the difference is made up by a gain in production and delivery of military aircraft.

To Vote on Merger

CHICAGO, May 11—Stockholders of Advance Rumely Co. will vote May 29, in LaPorte, Ind., on a tentative contract with Allis-Chalmers Manufacturing Co. whereby the latter will acquire substantially all of the assets and the goodwill of Advance Rumely in exchange for a block of stock not to exceed 114,500 shares. The tentative agreement was approved by directors of Advance Rumely this week.

DeSoto Adds Sedan

DETROIT, May 11—DeSoto Motor Corp. has extended the price range of its six-cylinder chassis to a new low field by the addition of a two-door sedan listing at \$715. A de luxe sedan has also been added to both the six and the eight-cylinder chassis, the former listing at \$820, and the latter at \$995.

Diamond T Shipments Up

CHICAGO, May 11—Shipments of trucks by the Diamond T Motor Car Co. during April were the largest in 11 months, representing a 60 per cent increase over March, according to an announcement made by C. A. Tilt, president.

Showing Convertible Types

AUBURN, Ind., May 11—A special showing of Auburn convertible models is being made by dealers and distributors in various parts of the country.

M. & E. A. Plans New Federation

Manufacturers' and
Wholesalers' Division
To Separate Activities

DETROIT, May 11—The Board of Directors of the Motor and Equipment Association at its recent meeting unanimously approved changes in the by-laws of the Motor and Equipment Association which create a federated association composed of separate, self-governing but cooperating manufacturers' and jobbers' associations.

Details of the federation will be worked out at an early date by committees and by councillors of the present Divisions "A," "B" and "C" for final approval of the membership.

The plan broadly will create a Federated Motor and Equipment Association, a Motor and Equipment Manufacturers Association, and a Motor and Equipment Wholesalers Association. Both of the latter will be members of the Federated Motor and Equipment Association.

Each association will conduct its own activities, have a definite money reserve resulting from an allocation of the present surplus, its own officers, board of directors, and paid personnel.

The Federation will be responsible for work national in scope and of mutual interest to the member associations.

LaFrance Adds Bus

ALMA, MICH., May 11—LaFrance Republic Corp. announces an addition to its present line of commercial chassis with the introduction of a new 25 to 30-passenger de luxe bus chassis listing at \$3,225. Known as the model F-3, this bus will be supplied in wheelbases of 198, 220 and 235 in. It carries an 80-hp. six-cylinder motor, four-speed transmission, four-wheel hydraulic brakes with booster, and kick-up type frame for a loading height of only 26 in.

The company states that the chassis is also adaptable to many hauling needs requiring low-slung heavy-duty construction, such as in garbage vans, and other special body applications.

Ramet Corp. Formed

CHICAGO, May 11—Ramet Corp. of America has been formed to take over the United States and Canadian rights to "Ramet," a hard cutting metal developed by the Fansteel Products Co., Inc. The new corporation will be a wholly-owned subsidiary of Fansteel and will be headed by J. M. Troxel as president. C. E. Stryker will be vice-president and general manager.

Willys Orders Increase

TOLEDO, May 11—Willys-Overland's unfilled orders up to May 6 showed an increase of 9 per cent over the same comparative period of April with expectation of further improvement as the month progresses, George M. Graham, vice-president, has reported.

+ + CALENDAR + + OF COMING EVENTS

SHOWS

International Garage Exposition, Berlin, Germany May 9-Aug. 9

CONVENTIONS

Automotive Engine Rebuilders Assn., Chicago May 18-21
American Society Mechanical Engineers, State College, Pa. May 22
Retail Delivery Assn. Convention, Washington, D. C. May 25-28
National Foreign Trade Council, New York May 27-29
Natl. Automobile Chamber of Commerce, New York City (Directors' Meeting) June 3
Natl. Automobile Chamber of Commerce, New York City (Members' Meeting) June 4
S.A.E. Summer Meeting, White Sulphur Springs June 14-19
Steel Founders Society (Mid-Summer), French Lick, Ind. June 17-19
National Association of Credit Men, Boston, Mass. June 22-27
American Society Mechanical Engineers, Madison, Wis. (Oil and Gas Power Meeting) June 23-26
National Association of Taxicab Owners, Chicago, Ill. June 29-30
S.A.E. Aeronautic Meeting (in conjunction with Natl. Air Races), Cleveland, Ohio Sept. 1-3
Eastern States Exposition, Springfield, Mass. Sept. 20-26
American Welding Society, Boston, Mass. Sept. 21-25
National Safety Council, Chicago, Ill. Oct. 12-16
Society Industrial Engineers, Pittsburgh, Pa. Oct. 14-16
Transportation Meeting, S.A.E., Washington, D. C. Nov. 10-12

Checker Adds Utility Type

NEW YORK, May 11—Checker Cab Manufacturing Corp. is showing a new utility car which is convertible into a package delivery car or station wagon.

The chassis is the same as that of a Checker Cab. The price is \$1,795 f.o.b. Kalamazoo.

Nash Demand Gains

CHICAGO, May 11—Demand for new Nash cars increased more than 105 per cent from April 1 to April 30 this year, C. H. Bliss, vice-president in charge of sales of the Nash Motors Co., has announced. This percentage of increase is based on the growth of orders received for April delivery.

Pines Adds Two Devices

CHICAGO, May 11—Large-scale production started this week on the two new products of Pines Winterfront Co., a battery-filling unit and a direction signal light set, it is announced by Charles A. Pipenhagen, chairman of the board.

Gear Makers Plan Index

Begin Collection of
Production Figures
From Member Group

BUFFALO, May 11—An additional index of industrial activity probably will become available to business men and economists within the next few years, for the American Gear Manufacturers Association has begun to collect monthly figures of production of its members. At the annual meeting of the association, which was held at the Statler Hotel here May 7-9, charts were displayed showing (in relative values) not only the total monthly productions of those members who are cooperating in the work, for 1928, 1929, 1930, and January, February and March of the current year, but also production values in five different classes — automotive gears, small industrial gearing, large industrial gearing, small speed reducers and large speed reducers.

For the present the actual figures are being furnished regularly only to those members who disclose their own production values; this arrangement, of course, is intended to stimulate the interest of other members in the work, and it is to be expected that when all or nearly all are contributing, the figures will be made public regularly, the same as monthly figures of steel and weekly figures of automobile production are now being published.

While the attendance at the meeting was rather smaller than usual, the program of technical papers and committees' reports is of unusual merit, and there was no flagging of interest in the discussions up to the time of adjournment. Elections for members of the executive committee were held. Out of a list of eight candidates proposed by a nominating committee, the following four (all of whom were already members of the committee) were elected: F. B. Drake, Johnson Gear Co.; E. W. Miller, Fellows Gear Shaper Co.; E. S. Sawtelle, Tool Steel Gear & Pinion Co., and P. L. Tenney, Muncie Products Division of General Motors Corp. At an executive committee meeting held at noon on Friday all of the old officers were re-elected.

It was decided to hold the fall meeting of the association in Pittsburgh some time during October. Resolutions of sympathy were adopted on the deaths of two members since the last meeting, H. G. Turley of the Turley Gear and Machine Co. of St. Louis, and William Ganschow of Chicago, a vice-president of Gears & Forgings, Inc. A general report of the meeting will appear in next week's issue of *Automotive Industries*.